CONTAINS NO CBI

SECTION 1 GENERAL MANUFACTURER, IMPORTER, AND PROCESSOR INFORMATION

PART A GENERAL REPORTING INFORMATION

1.01 This Comprehensive Assessment Information Rule (CAIR) Reporting Form has been completed in response to the Federal Register Notice of..... [1][2] [2][2] [8][8]
mo. day year

CBI

[ ] a. If a Chemical Abstracts Service Number (CAS No.) is provided in the Federal Register, list the CAS No. ..... [0][2][6][4][7][1]-[6][2]-[5]

b. If a chemical substance CAS No. is not provided in the Federal Register, list either (i) the chemical name, (ii) the mixture name, or (iii) the trade name of the chemical substance as provided in the Federal Register.

(i) Chemical name as listed in the rule ..... _____

(ii) Name of mixture as listed in the rule .... _____

(iii) Trade name as listed in the rule ..... _____

c. If a chemical category is provided in the Federal Register, report the name of the category as listed in the rule, the chemical substance CAS No. you are reporting on which falls under the listed category, and the chemical name of the substance you are reporting on which falls under the listed category.

Name of category as listed in the rule ..... _____

CAS No. of chemical substance ..... [ ][ ][ ][ ][ ][ ]-[ ][ ]-[ ]

Name of chemical substance ..... _____

1.02 Identify your reporting status under CAIR by circling the appropriate response(s).

CBI

[ ] Manufacturer 1

[ ] Importer 2

(Processor) 3

X/P manufacturer reporting for customer who is a processor 4

X/P processor reporting for customer who is a processor 5

EPA-OTS

0006111354K

90-8900000568

[ ] Mark (X) this box if you attach a continuation sheet.

DCO Recd. 7-28-89

1.03 Does the substance you are reporting on have an "x/p" designation associated with it in the above-listed Federal Register Notice?

CBI

[ ]

(Yes) ..... [ ] Go to question 1.04

No ..... [ ] Go to question 1.05

1.04 a. Do you manufacture, import, or process the listed substance and distribute it under a trade name(s) different than that listed in the Federal Register Notice? Circle the appropriate response.

CBI

[ ]

Yes 1

(No) 2

b. Check the appropriate box below:

[ ] You have chosen to notify your customers of their reporting obligations

Provide the trade name(s) .... _____

_____

[ ] You have chosen to report for your customers

[ ] You have submitted the trade name(s) to EPA one day after the effective date of the rule in the Federal Register Notice under which you are reporting.

1.05 If you buy a trade name product and are reporting because you were notified of your reporting requirements by your trade name supplier, provide that trade name.

CBI

[ ]

Trade name ..... Mondur TD-80

Is the trade name product a mixture? Circle the appropriate response.

(Yes) 1

No 2

1.06 Certification -- The person who is responsible for the completion of this form must sign the certification statement below:

CBI

[ ]

"I hereby certify that, to the best of my knowledge and belief, all information entered on this form is complete and accurate."

David Schmetterer (NAME) | [signature] (SIGNATURE) | 7-24-89 (DATE SIGNED)

Vice-President (TITLE) | (312) 376 - 7132 (TELEPHONE NO.)

[ ] Mark (X) this box if you attach a continuation sheet.

N/A

1.07 Exemptions From Reporting -- If you have provided EPA or another Federal agency with the required information on a CAIR Reporting Form for the listed substance within the past 3 years, and this information is current, accurate, and complete for the time period specified in the rule, then sign the certification below. You are required to complete section 1 of this CAIR form and provide any information now required but not previously submitted. Provide a copy of any previous submissions along with your Section 1 submission.

CBI
[ ]

"I hereby certify that, to the best of my knowledge and belief, all required information which I have not included in this CAIR Reporting Form has been submitted to EPA within the past 3 years and is current, accurate, and complete for the time period specified in the rule."

NAME	SIGNATURE	DATE SIGNED
TITLE	(_____) _____ - _____ TELEPHONE NO.	DATE OF PREVIOUS SUBMISSION

1.08 CBI Certification -- If you have asserted any CBI claims in this report you must certify that the following statements truthfully and accurately apply to all of those confidentiality claims which you have asserted.

CBI
[ ]

"My company has taken measures to protect the confidentiality of the information, and it will continue to take these measures; the information is not, and has not been, reasonably ascertainable by other persons (other than government bodies) by using legitimate means (other than discovery based on a showing of special need in a judicial or quasi-judicial proceeding) without my company's consent; the information is not publicly available elsewhere; and disclosure of the information would cause substantial harm to my company's competitive position."

NAME	SIGNATURE	DATE SIGNED
TITLE	(_____) _____ - _____ TELEPHONE NO.	

[ ] Mark (X) this box if you attach a continuation sheet.

PART B CORPORATE DATA

1.09 Facility Identification

CBI Name [C][R][A][W][F][O][R][D]_[L][A][B][O][R][A][T][O][R][I][E][S]_____

[ ] Address [4][1][6][5]_[S][O][U][T][H]_[E][M][E][R][A][L][D]_[A][V][E]_____
Street

[C][H][I][C][A][G][O]_____
City

[I][L] [6][0][6][0][9]--____
State Zip

Dun & Bradstreet Number .....[0][0]-[5][4][7]-[3][3][5][0]

EPA ID Number .....[0][0][5][4][7][3][3][5][0]

Employer ID Number .....[3][6][2][3][1][2][7][6] /

Primary Standard Industrial Classification (SIC) Code .....[2][8][5][1]

Other SIC Code .....____

Other SIC Code .....____

1.10 Company Headquarters Identification

CBI Name [C][R][A][W][F][O][R][D]_[L][A][B][O][R][A][T][O][R][I][E][S]_____

[ ] Address [4][1][6][5]_[S][O][U][T][H]_[E][M][E][R][A][L][D]_[A][V][E]_____
Street

[C][H][I][C][A][G][O]_____
City

[I][L] [6][0][6][0][9]--____
State Zip

Dun & Bradstreet Number .....[0][0]-[5][4][7]-[3][3][5][0]

Employer ID Number .....[3][6][2][3][1][2][7][6] /

[ ] Mark (X) this box if you attach a continuation sheet.

1.11 Parent Company Identification

N/A

CBI Name [_]

[_] Address [_]
Street

[_]
City

[_][_] State [_][_][_][_][_]--[_][_][_][_] Zip

Dun & Bradstreet Number ....[_][_]-[_][_][_]-[_][_][_][_]

1.12 Technical Contact

CBI Name [D][A][V][I][D][_][S][C][H][M][E][T][T][E][R][E][R][_][_][_][_][_][_][_][_][_][_]

[_] Title [V][I][C][E][-][P][R][E][S][I][D][E][N][T][_][_][_][_][_][_][_][_][_][_][_][_][_]

Address [4][7][6][5][_][S][O][U][T][H][_][E][M][E][R][A][L][D][_][A][V][E][_][_][_]
Street

[C][H][I][C][A][G][O][_][_][_][_][_][_][_][_][_][_][_][_][_][_][_][_][_][_]
City

[I][L] State [6][0][6][0][9]--[_][_][_][_] Zip

Telephone Number ....[3][1][2]-[3][7][6]-[7][1][3][2]

1.13 This reporting year is from .... [0][1] Mo. [8][8] Year to [1][2] Mo. [8][8] Year

[_] Mark (X) this box if you attach a continuation sheet.

1.14 Facility Acquired -- If you purchased this facility during the reporting year, provide the following information about the seller:

N/A

CBI Name of Seller [__]

[__] Mailing Address [__]
Street

[__]
City

[__][__] [__][__][__][__][__]--[__][__][__][__]
State Zip

Employer ID Number .....[__][__][__][__][__][__][__][__]

Date of Sale .....[__][__] [__][__] [__][__]
Mo. Day Year

Contact Person [__]

Telephone Number .....[__][__][__]-[__][__][__]-[__][__][__][__]

1.15 Facility Sold -- If you sold this facility during the reporting year, provide the following information about the buyer:

N/A

CBI Name of Buyer [__]

[__] Mailing Address [__]
Street

[__]
City

[__][__] [__][__][__][__][__]--[__][__][__][__]
State Zip

Employer ID Number .....[__][__][__][__][__][__][__][__]

Date of Purchase .....[__][__] [__][__] [__][__]
Mo. Day Year

Contact Person [__]

Telephone Number .....[__][__][__]-[__][__][__]-[__][__][__][__]

[__] Mark (X) this box if you attach a continuation sheet.

1.16 For each classification listed below, state the quantity of the listed substance that was manufactured, imported, or processed at your facility during the reporting year.

CBI

[ ]

Classification	Quantity (kg/yr)
Manufactured	N/A
Imported	N/A
Processed (include quantity repackaged)	56,640
Of that quantity manufactured or imported, report that quantity:	
In storage at the beginning of the reporting year	N/A
For on-site use or processing	N/A
For direct commercial distribution (including export)	N/A
In storage at the end of the reporting year	N/A
Of that quantity processed, report that quantity:	
In storage at the beginning of the reporting year	4,350
Processed as a reactant (chemical producer)	36,976
Processed as a formulation component (mixture producer)	15,950
Processed as an article component (article producer)	0
Repackaged (including export)	0
In storage at the end of the reporting year	8,064

[ ] Mark (X) this box if you attach a continuation sheet.

PART C IDENTIFICATION OF MIXTURES

1.17 Mixture -- If the listed substance on which you are required to report is a mixture or a component of a mixture, provide the following information for each component chemical. (If the mixture composition is variable, report an average percentage of each component chemical for all formulations.)

CBI

[ ]

Component Name	Supplier Name	Average % Composition by Weight (specify precision, e.g., 45% ± 0.5%)
2,4 Toulene Diisocyanate	Mobay	80%
2,6 Toulene Diisocyanate	Mobay	20%
	Total	100%

[ ] Mark (X) this box if you attach a continuation sheet.

2.04 State the quantity of the listed substance that your facility manufactured, imported, or processed during the 3 corporate fiscal years preceding the reporting year in descending order.

CBI

[ ] Year ending ..... [1][2] Mo. [8][7] Year

Quantity manufactured ..... N/A kg

Quantity imported ..... N/A kg

Quantity processed ..... 27,709 kg

Year ending ..... [1][2] Mo. [8][6] Year

Quantity manufactured ..... N/A kg

Quantity imported ..... N/A kg

Quantity processed ..... 29,545 kg

Year ending ..... [1][2] Mo. [8][5] Year

Quantity manufactured ..... N/A kg

Quantity imported ..... N/A kg

Quantity processed ..... 44,636 kg

2.05 Specify the manner in which you manufactured the listed substance. Circle all appropriate process types.

CBI

N/A

[ ]

Continuous process 1

Semicontinuous process 2

Batch process 3

[ ] Mark (X) this box if you attach a continuation sheet.

2.06 Specify the manner in which you processed the listed substance. Circle all appropriate process types.

CBI

[ ]

Continuous process 1

Semicontinuous process 2

(Batch process) 3

2.07 State your facility's name-plate capacity for manufacturing or processing the listed substance. (If you are a batch manufacturer or batch processor, do not answer this question.)

CBI

[ ]

Manufacturing capacity ..... N/A kg/yr

Processing capacity ..... N/A kg/yr

2.08 If you intend to increase or decrease the quantity of the listed substance manufactured, imported, or processed at any time after your current corporate fiscal year, estimate the increase or decrease based upon the reporting year's production volume.

CBI

[ ]

N/A

	Manufacturing Quantity (kg)	Importing Quantity (kg)	Processing Quantity (kg)
Amount of increase			
Amount of decrease			

[ ] Mark (X) this box if you attach a continuation sheet.

2.09 For the three largest volume manufacturing or processing process types involving the listed substance, specify the number of days you manufactured or processed the listed substance during the reporting year. Also specify the average number of hours per day each process type was operated. (If only one or two operations are involved, list those.)

CBI

[ ]

	Days/Year	Average Hours/Day
Process Type #1 (The process type involving the largest quantity of the listed substance.)		
Manufactured	N/A	N/A
Processed	104	8
Process Type #2 (The process type involving the 2nd largest quantity of the listed substance.)		
Manufactured	N/A	N/A
Processed	18	4
Process Type #3 (The process type involving the 3rd largest quantity of the listed substance.)		
Manufactured	N/A	N/A
Processed	N/A	N/A

2.10 State the maximum daily inventory and average monthly inventory of the listed substance that was stored on-site during the reporting year in the form of a bulk chemical.

CBI

[ ]

Maximum daily inventory	_____	_____ kg
Average monthly inventory	_____	kg

[ ] Mark (X) this box if you attach a continuation sheet.

2.11 Related Product Types -- List any byproducts, coproducts, or impurities present with the listed substance in concentrations greater than 0.1 percent as it is manufactured, imported, or processed. The source of byproducts, coproducts, or impurities means the source from which the byproducts, coproducts, or impurities are made or introduced into the product (e.g., carryover from raw material, reaction product, etc.).

CBI

[ ]

N/A

CAS No.	Chemical Name	Byproduct, Coproduct or Impurity[1]	Concentration (%) (specify ± % precision)	Source of Byproducts, Coproducts, or Impurities

[1]Use the following codes to designate byproduct, coproduct, or impurity:

B = Byproduct
C = Coproduct
I = Impurity

[ ] Mark (X) this box if you attach a continuation sheet.

2.12 Existing Product Types -- List all existing product types which you manufactured, imported, or processed using the listed substance during the reporting year. List the quantity of listed substance you use for each product type as a percentage of the total volume of listed substance used during the reporting year. Also list the quantity of listed substance used captively on-site as a percentage of the value listed under column b., and the types of end-users for each product type. (Refer to the instructions for further explanation and an example.)

CBI

[ ]

a. Product Types[1]	b. % of Quantity Manufactured, Imported, or Processed	c. % of Quantity Used Captively On-Site	d. Type of End-Users[2]
K	72 %	100 %	N/A
K	28 %	0	I

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/ Sensitizer
D = Inhibitor/Stabilizer/Scavenger/ Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.13 Expected Product Types -- Identify all product types which you expect to manufacture, import, or process using the listed substance at any time after your current corporate fiscal year. For each use, specify the quantity you expect to manufacture, import, or process for each use as a percentage of the total volume of listed substance used during the reporting year. Also list the quantity of listed substance used captively on-site as a percentage of the value listed under column b., and the types of end-users for each product type. (Refer to the instructions for further explanation and an example.)

CBI
[ ]

a. Product Types[1]	b. % of Quantity Manufactured, Imported, or Processed	c. % of Quantity Used Captively On-Site	d. Type of End-Users[2]
K	72%	100%	N/A
K	28%	0	I

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/Sensitizer
D = Inhibitor/Stabilizer/Scavenger/Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.14 CBI [ ] Final Product -- Complete the following table for each type of final product manufactured, imported, or processed at your facility that contains the listed substance other than as an impurity.

a. Product Type[1]	b. Final Product's Physical Form[2]	c. Average % Composition of Listed Substance in Final Product	d. Type of End-Users[3]
K	B	18%	I

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/Sensitizer
D = Inhibitor/Stabilizer/Scavenger/Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the final product's physical form:

A = Gas
B = Liquid
C = Aqueous solution
D = Paste
E = Slurry
F1 = Powder
F2 = Crystalline solid
F3 = Granules
F4 = Other solid
G = Gel
H = Other (specify) _____

[3]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.15 Circle all applicable modes of transportation used to deliver bulk shipments of the CBI listed substance to off-site customers.

[ ] Truck ..... N/A 1

Railcar 2

Barge, Vessel 3

Pipeline 4

Plane 5

Other (specify) _____ 6

2.16 Customer Use -- Estimate the quantity of the listed substance used by your customers or prepared by your customers during the reporting year for use under each category CBI of end use listed (i-iv).

[ ] N/A

Category of End Use

i. Industrial Products

Chemical or mixture ..... _____ kg/yr

Article ..... _____ kg/yr

ii. Commercial Products

Chemical or mixture ..... _____ kg/yr

Article ..... _____ kg/yr

iii. Consumer Products

Chemical or mixture ..... _____ kg/yr

Article ..... _____ kg/yr

iv. Other

Distribution (excluding export) ..... _____ kg/yr

Export ..... _____ kg/yr

Quantity of substance consumed as reactant ..... _____ kg/yr

Unknown customer uses ..... _____ kg/yr

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 3 PROCESSOR RAW MATERIAL IDENTIFICATION

PART A GENERAL DATA

3.01 Specify the quantity purchased and the average price paid for the listed substance for each major source of supply listed. Product trades are treated as purchases.
CBI The average price is the market value of the product that was traded for the listed substance.
[ ]

Source of Supply	Quantity (kg)	Average Price ($/kg)
The listed substance was manufactured on-site.	N/A	N/A
The listed substance was transferred from a different company site.	N/A	N/A
The listed substance was purchased directly from a manufacturer or importer.	56,640	$1.155
The listed substance was purchased from a distributor or repackager.	N/A	N/A
The listed substance was purchased from a mixture producer.	N/A	N/A

3.02 Circle all applicable modes of transportation used to deliver the listed substance to
CBI your facility.
[ ]

(Truck) 1
Railcar 2
Barge, Vessel 3
Pipeline 4
Plane 5
Other (specify) _____ 6

[ ] Mark (X) this box if you attach a continuation sheet.

3.03 CBI a. Circle all applicable containers used to transport the listed substance to your facility.

[ ]

Bags 1

Boxes 2

Free standing tank cylinders 3

Tank rail cars 4

Hopper cars 5

(Tank trucks) 6

Hopper trucks 7

Drums 8

Pipeline 9

Other (specify) _____ 10

b. If the listed substance is transported in pressurized tank cylinders, tank rail cars, or tank trucks, state the pressure of the tanks.

Tank cylinders ..... N/A mmHg

Tank rail cars ..... N/A mmHg

Tank trucks ..... N/A mmHg

[ ] Mark (X) this box if you attach a continuation sheet.

PART B RAW MATERIAL IN THE FORM OF A MIXTURE

3.04 If you obtain the listed substance in the form of a mixture, list the trade name(s) of the mixture, the name of its supplier(s) or manufacturer(s), an estimate of the average percent composition by weight of the listed substance in the mixture, and the amount of mixture processed during the reporting year.

CBI

[ ]

N/A

Trade Name	Supplier or Manufacturer	Average % Composition by Weight (specify ± % precision)	Amount Processed (kg/yr)

[ ] Mark (X) this box if you attach a continuation sheet.

PART C RAW MATERIAL VOLUME

3.05 CBI [ ] State the quantity of the listed substance used as a raw material during the reporting year in the form of a class I chemical, class II chemical, or polymer, and the percent composition, by weight, of the listed substance.

	Quantity Used (kg/yr)	% Composition by Weight of Listed Substance in Raw Material (specify ± % precision)
Class I chemical	56,640	100% ± 1%
Class II chemical	N/A	
Polymer	N/A	

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 4 PHYSICAL/CHEMICAL PROPERTIES

General Instructions:

If you are reporting on a mixture as defined in the glossary, reply to questions in Section 4 that are inappropriate to mixtures by stating "NA -- mixture."

For questions 4.06-4.15, if you possess any hazard warning statement, label, MSDS, or other notice that addresses the information requested, you may submit a copy or reasonable facsimile in lieu of answering those questions which it addresses.

PART A PHYSICAL/CHEMICAL DATA SUMMARY

4.01 Specify the percent purity for the three major[1] technical grade(s) of the listed substance as it is manufactured, imported, or processed. Measure the purity of the substance in the final product form for manufacturing activities, at the time you import the substance, or at the point you begin to process the substance.

CBI
[ ]

	Manufacture	Import	Process
Technical grade #1	N/A % purity	N/A % purity	99.9 % purity
Technical grade #2	N/A % purity	N/A % purity	N/A % purity
Technical grade #3	N/A % purity	N/A % purity	N/A % purity

[1]Major = Greatest quantity of listed substance manufactured, imported or processed.

4.02 Submit your most recently updated Material Safety Data Sheet (MSDS) for the listed substance, and for every formulation containing the listed substance. If you possess an MSDS that you developed and an MSDS developed by a different source, submit your version. Indicate whether at least one MSDS has been submitted by circling the appropriate response.

(Yes) 1

No 2

Indicate whether the MSDS was developed by your company or by a different source.

Your company 1

(Another source) 2

[ ] Mark (X) this box if you attach a continuation sheet.

4.03 Submit a copy or reasonable facsimile of any hazard information (other than an MSDS) that is provided to your customers/users regarding the listed substance or any formulation containing the listed substance. Indicate whether this information has been submitted by circling the appropriate response.

Yes 1

(No) 2

4.04 For each activity that uses the listed substance, circle all the applicable number(s) corresponding to each physical state of the listed substance during the activity listed. Physical states for importing and processing activities are determined at the time you import or begin to process the listed substance. Physical states for manufacturing, storage, disposal and transport activities are determined using the final state of the product.

CBI

[ ]

	Physical State				
Activity	Solid	Slurry	Liquid	Liquified Gas	Gas
Manufacture	1	2	3	4	5
Import	1	2	3	4	5
Process	1	2	(3)	4	5
Store	1	2	3	4	5
Dispose	1	2	3	4	5
Transport	1	2	3	4	5

[ ] Mark (X) this box if you attach a continuation sheet.

4.05 Particle Size -- If the listed substance exists in particulate form during any of the following activities, indicate for each applicable physical state the size and the percentage distribution of the listed substance by activity. Do not include particles ≥10 microns in diameter. Measure the physical state and particle sizes for importing and processing activities at the time you import or begin to process the listed substance. Measure the physical state and particle sizes for manufacturing storage, disposal and transport activities using the final state of the product.

CBI

[ ]

N/A

Physical State		Manufacture	Import	Process	Store	Dispose	Transport
Dust	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Powder	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Fiber	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Aerosol	<1 micron						
	1 to <5 microns						
	5 to <10 microns						

[ ] Mark (X) this box if you attach a continuation sheet.

CRAWFORD
LABORATORIES

July 18, 1989

Questions for Section 5:

The answers for Section 5 are not available.

Question 7.03:

This is Not Applicable because Crawford gets a yield that is equal to approximately 99% of raw materials processed.

Florock Seamless Floor Systems
Military Specification Coatings • Industrial Coatings

4165 South Emerald Avenue Chicago, Illinois 60609 312-376-7132 FAX: 312-376-0945

N/A

SECTION 5 ENVIRONMENTAL FATE

PART A RATE CONSTANTS AND TRANSFORMATION PRODUCTS

5.01 Indicate the rate constants for the following transformation processes.

a. Photolysis:

Absorption spectrum coefficient (peak) .... _____ (1/M cm) at _____ nm

Reaction quantum yield, ϕ ..... _____ at _____ nm

Direct photolysis rate constant, k_p, at ... _____ 1/hr _____ latitude

b. Oxidation constants at 25°C:

For $^1O_2$ (singlet oxygen), k_{ox} ..... _____ 1/M hr

For RO_2 (peroxy radical), k_{ox} ..... _____ 1/M hr

c. Five-day biochemical oxygen demand, BOD_5 ... _____ mg/l

d. Biotransformation rate constant:

For bacterial transformation in water, k_b... _____ 1/hr

Specify culture ..... _____

e. Hydrolysis rate constants:

For base-promoted process, k_B ..... _____ 1/M hr

For acid-promoted process, k_A ..... _____ 1/M hr

For neutral process, k_N ..... _____ 1/hr

f. Chemical reduction rate (specify conditions) _____

_____

g. Other (such as spontaneous degradation) ... _____

_____

[ ] Mark (X) this box if you attach a continuation sheet.

6.04 For each market listed below, state the quantity sold and the total sales value of
CBI the listed substance sold or transferred in bulk during the reporting year.

[ ]

Market	Quantity Sold or Transferred (kg/yr)	Total Sales Value ($/yr)
Retail sales		
Distribution -- Wholesalers		
Distribution -- Retailers		
Intra-company transfer		
Repackagers		
Mixture producers		
Article producers		
Other chemical manufacturers or processors		
Exporters		
Other (specify)		

6.05 Substitutes -- List all known commercially feasible substitutes that you know exist for the listed substance and state the cost of each substitute. A commercially feasible substitute is one which is economically and technologically feasible to use
CBI in your current operation, and which results in a final product with comparable performance in its end uses.

[ ]

Substitute	Cost ($/kg)
UK	UK

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 7 MANUFACTURING AND PROCESSING INFORMATION

General Instructions:

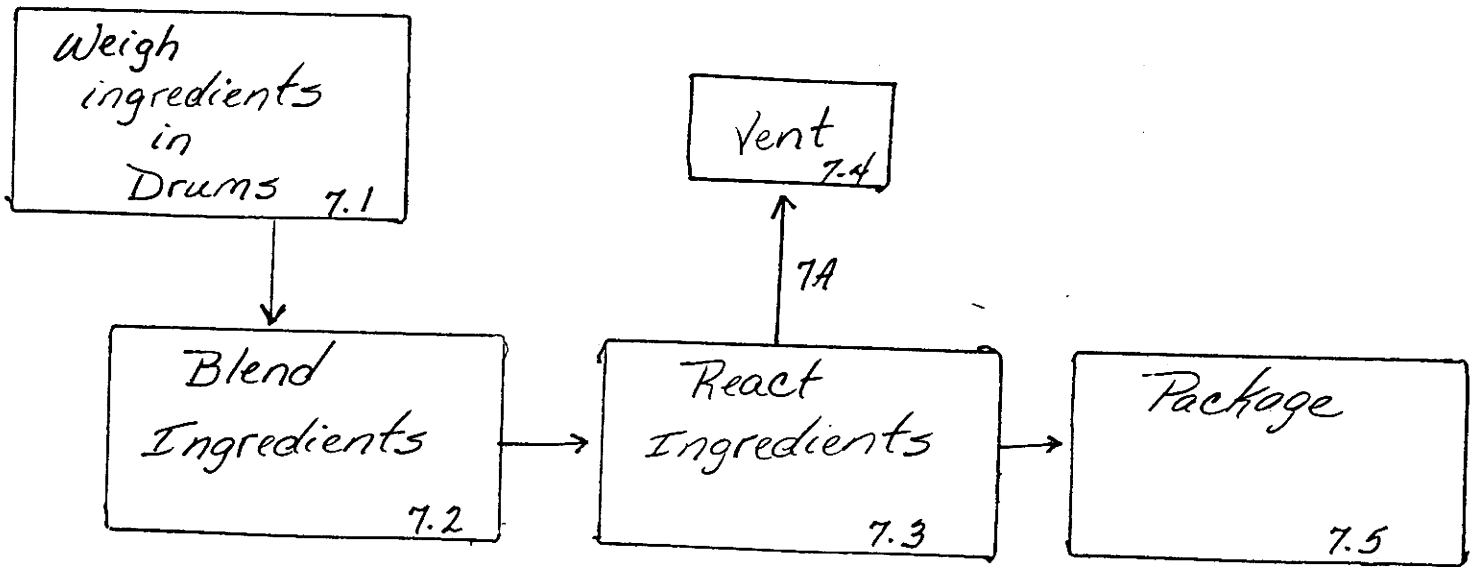
For questions 7.04-7.06, provide a separate response for each process block flow diagram provided in questions 7.01, 7.02, and 7.03. Identify the process type from which the information is extracted.

PART A MANUFACTURING AND PROCESSING PROCESS TYPE DESCRIPTION

7.01 In accordance with the instructions, provide a process block flow diagram showing the major (greatest volume) process type involving the listed substance.

CBI

[ ] Process type ..... _____



[ ] Mark (X) this box if you attach a continuation sheet.

7.03 In accordance with the instructions, provide a process block flow diagram showing all process emission streams and emission points that contain the listed substance and which, if combined, would total at least 90 percent of all facility emissions if not treated before emission into the environment. If all such emissions are released from one process type, provide a process block flow diagram using the instructions for question 7.01. If all such emissions are released from more than one process type, provide a process block flow diagram showing each process type as a separate block.

CBI N/A

[ ] Process type ..... _____

[ ] Mark (X) this box if you attach a continuation sheet.

7.04 Describe the typical equipment types for each unit operation identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Unit Operation ID Number	Typical Equipment Type	Operating Temperature Range (°C)	Operating Pressure Range (mm Hg)	Vessel Composition
7.1	Floor Scale	Ambient	Atmospheric	Steel
7.2	Reactor	Ambient	Atmospheric	Stainless Ste
7.3	Reactor	60-70°	Atmospheric	Stain. Steel
7.4	Gear Pump	Ambient	Atmospheric	Carbon Steel

[ ] Mark (X) this box if you attach a continuation sheet.

7.05 Describe each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Process Stream ID Code	Process Stream Description	Physical State[1]	Stream Flow (kg/yr)
7A	Fume Exhaust Vent	GC	UK

[1]Use the following codes to designate the physical state for each process stream:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[ ] Mark (X) this box if you attach a continuation sheet.

7.06 Characterize each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the CBI instructions for further explanation and an example.)

[ ] Process type ..... _____

a. Process Stream ID Code	b. Known Compounds[1]	c. Concentrations[2,3] (% or ppm)	d. Other Expected Compounds	e. Estimated Concentrations (% or ppm)
7A	Polyol, TDI, Solvents	UK	N/A	N/A

7.06 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

7.06 (continued)

[1]For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column b. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

Additive Package Number	Components of Additive Package	Concentrations (% or ppm)
1		
2		
3		
4		
5		

[2]Use the following codes to designate how the concentration was determined:

A = Analytical result
E = Engineering judgement/calculation

[3]Use the following codes to designate how the concentration was measured:

V = Volume
W = Weight

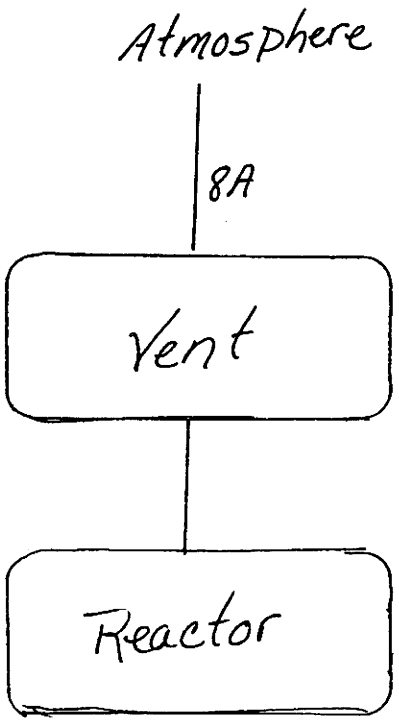
[ ] Mark (X) this box if you attach a continuation sheet.

PART A RESIDUAL TREATMENT PROCESS DESCRIPTION

8.01 In accordance with the instructions, provide a residual treatment block flow diagram which describes the treatment process used for residuals identified in question 7.01.

CBI

[ ] Process type ..... _____



[ ] Mark (X) this box if you attach a continuation sheet.

PART B RESIDUAL GENERATION AND CHARACTERIZATION

8.05 Characterize each process stream identified in your residual treatment block flow diagram(s). If a residual treatment block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process
CBI type. (Refer to the instructions for further explanation and an example.)

[ ] Process type ..... _____

a. Stream ID Code	b. Type of Hazardous Waste[1]	c. Physical State of Residual[2]	d. Known Compounds[3]	e. Concentrations (% or ppm)[4,5,6]	f. Other Expected Compounds	g. Estimated Concentrations (% or ppm)
8A	I	GC	N/A	N/A	N/A	N/A

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[1]Use the following codes to designate the type of hazardous waste:

I = Ignitable
C = Corrosive
R = Reactive
E = EP toxic
T = Toxic
H = Acutely hazardous

[2]Use the following codes to designate the physical state of the residual:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[3]For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column d. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

Additive Package Number	Components of Additive Package	Concentrations (% or ppm)
1		
2		
3		
4		
5		

[4]Use the following codes to designate how the concentration was determined:

A = Analytical result
E = Engineering judgement/calculation

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[5]Use the following codes to designate how the concentration was measured:

V = Volume
W = Weight

[6]Specify the analytical test methods used and their detection limits in the table below. Assign a code to each test method used and list those codes in column e.

Code	Method	Detection Limit (± ug/l)
1		
2		
3		
4		
5		
6		

[ ] Mark (X) this box if you attach a continuation sheet.

8.22 Describe the combustion chamber design parameters for each of the three largest (by capacity) incinerators that are used on-site to burn the residuals identified in
CBI your process block or residual treatment block flow diagram(s).

[ ]

Incinerator	Combustion Chamber Temperature (°C)		Location of Temperature Monitor		Residence Time In Combustion Chamber (seconds)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
1						
2						
3						

Indicate if Office of Solid Waste survey has been submitted in lieu of response by circling the appropriate response.

Yes 1

No 2

8.23 Complete the following table for the three largest (by capacity) incinerators that are used on-site to burn the residuals identified in your process block or residual
CBI treatment block flow diagram(s). N/A

[ ]

Incinerator	Air Pollution Control Device[1]	Types of Emissions Data Available
1		
2		
3		

Indicate if Office of Solid Waste survey has been submitted in lieu of response by circling the appropriate response.

Yes 1

No 2

---

[1]Use the following codes to designate the air pollution control device:

S = Scrubber (include type of scrubber in parenthesis)
E = Electrostatic precipitator
O = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

PART A EMPLOYMENT AND POTENTIAL EXPOSURE PROFILE

9.01 Mark (X) the appropriate column to indicate whether your company maintains records on the following data elements for hourly and salaried workers. Specify for each data element the year in which you began maintaining records and the number of years the CBI records for that data element are maintained. (Refer to the instructions for further explanation and an example.)

[ ]

Data Element	Data are Maintained for: Hourly Workers	Salaried Workers	Year in Which Data Collection Began	Number of Years Records Are Maintained
Date of hire	X	X	1952	10 yrs
Age at hire	X	X	1952	10 yrs
Work history of individual before employment at your facility	X	X	1952	10 yrs.
Sex	X	X	1952	10
Race				
Job titles	X	X	1952	10
Start date for each job title	X	X	1952	10
End date for each job title	X	X	1952	10
Work area industrial hygiene monitoring data				
Personal employee monitoring data				
Employee medical history	X	X	1985	4 yrs.
Employee smoking history	X	X	1985	4
Accident history	X	X	1985	4
Retirement date	X	X	1952	10
Termination date	X	X	1952	10
Vital status of retirees				
Cause of death data				

[ ] Mark (X) this box if you attach a continuation sheet.

9.02 In accordance with the instructions, complete the following table for each activity in which you engage.

CBI

[ ]

a. Activity	b. Process Category	c. Yearly Quantity (kg)	d. Total Workers	e. Total Worker-Hours
Manufacture of the listed substance	Enclosed	N/A	N/A	N/A
	Controlled Release	N/A	N/A	N/A
	Open	N/A	N/A	N/A
On-site use as reactant	Enclosed	40,690	6	4800
	Controlled Release	N/A	N/A	N/A
	Open	N/A	N/A	N/A
On-site use as nonreactant	Enclosed	15,950	6	432
	Controlled Release	N/A	N/A	N/A
	Open	N/A	N/A	N/A
On-site preparation of products	Enclosed	N/A	N/A	N/A
	Controlled Release	N/A	N/A	N/A
	Open	N/A	N/A	N/A

[ ] Mark (X) this box if you attach a continuation sheet.

9.03 Provide a descriptive job title for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance.

CBI

[ ]

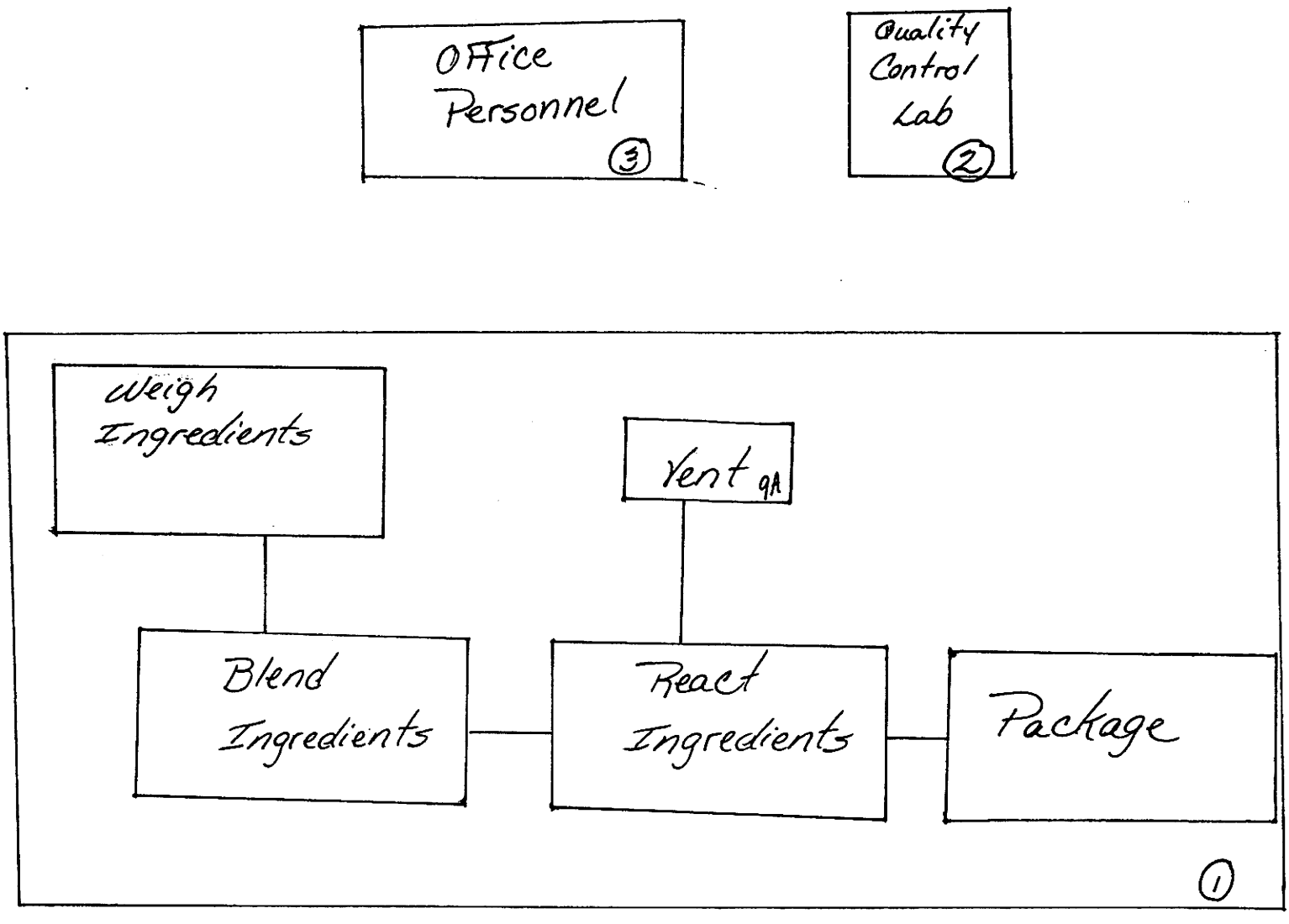
Labor Category	Descriptive Job Title
A	Materials Handler
B	Reactor Operator
C	Foremen
D	Analytical Chemist
E	Office personnel
F	
G	
H	
I	
J	

[ ] Mark (X) this box if you attach a continuation sheet.

9.04 In accordance with the instructions, provide your process block flow diagram(s) and indicate associated work areas.

CBI

[ ] Process type ..... _____



[ ] Mark (X) this box if you attach a continuation sheet.

9.05 Describe the various work area(s) shown in question 9.04 that encompass workers who may potentially come in contact with or be exposed to the listed substance. Add any additional areas not shown in the process block flow diagram in question 7.01 or 7.02. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type .....

Work Area ID	Description of Work Areas and Worker Activities
1	Reactor & Rotary Filler - workers measure ingred. & operate filling pumps)
2	Lab - Q.C. & monitor gauges
3	Office - All administration work
4	
5	
6	
7	
8	
9	
10	

[ ] Mark (X) this box if you attach a continuation sheet.

9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... _____

Work area ..... _____

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance[1]	Average Length of Exposure Per Day[2]	Number of Days per Year Exposed
A,B,C,D	16	Inhalation	GU	A	104
A,B,C,D	16	Direct skin contact	AL	A	104
E	2	Inhalation	GU	A	5
E	2	Direct skin contact	AL	A	5

[1]Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure; includes fumes, vapors, etc.)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[2]Use the following codes to designate average length of exposure per day:

A = 15 minutes or less
B = Greater than 15 minutes, but not exceeding 1 hour
C = Greater than one hour, but not exceeding 2 hours
D = Greater than 2 hours, but not exceeding 4 hours
E = Greater than 4 hours, but not exceeding 8 hours
F = Greater than 8 hours

[ ] Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

N/A

CBI

[ ] Process type ..... _____

Work area ..... _____

Labor Category	8-hour TWA Exposure Level (ppm, mg/m^3, other-specify)	15-Minute Peak Exposure Level (ppm, mg/m^3, other-specify)

[ ] Mark (X) this box if you attach a continuation sheet.

PART B WORK PLACE MONITORING PROGRAM

9.08 If you monitor worker exposure to the listed substance, complete the following table.

CBI

[ ]

N/A

Sample/Test	Work Area ID	Testing Frequency (per year)	Number of Samples (per test)	Who Samples[1]	Analyzed In-House (Y/N)	Number of Years Records Maintained
Personal breathing zone						
General work area (air)						
Wipe samples						
Adhesive patches						
Blood samples						
Urine samples						
Respiratory samples						
Allergy tests						
Other (specify) _____						
Other (specify) _____						
Other (specify) _____						

[1]Use the following codes to designate who takes the monitoring samples:

A = Plant industrial hygienist
B = Insurance carrier
C = OSHA consultant
D = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

9.09 For each sample type identified in question 9.08, describe the type of sampling and analytical methodology used for each type of sample. N/A

CBI

[ ]	Sample Type	Sampling and Analytical Methodology

9.10 If you conduct personal and/or ambient air monitoring for the listed substance, specify the following information for each equipment type used. N/A

CBI

[ ]	Equipment Type[1]	Detection Limit[2]	Manufacturer	Averaging Time (hr)	Model Number

[1]Use the following codes to designate personal air monitoring equipment types:

A = Passive dosimeter
B = Detector tube
C = Charcoal filtration tube with pump
D = Other (specify) _____

Use the following codes to designate ambient air monitoring equipment types:

E = Stationary monitors located within work area
F = Stationary monitors located within facility
G = Stationary monitors located at plant boundary
H = Mobile monitoring equipment (specify) _____
I = Other (specify) _____

[2]Use the following codes to designate detection limit units:

A = ppm
B = Fibers/cubic centimeter (f/cc)
C = Micrograms/cubic meter (μ/m^3)

[ ] Mark (X) this box if you attach a continuation sheet.

9.11 If you conduct routine medical tests for monitoring the health effects of exposure to the listed substance, specify the type and frequency of the tests. N/A

CBI

[ ]	Test Description	Frequency (weekly, monthly, yearly, etc.)

[ ] Mark (X) this box if you attach a continuation sheet.

PART C ENGINEERING CONTROLS

9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... _____

Work area ..... _____

Engineering Controls	Used (Y/N)	Year Installed	Upgraded (Y/N)	Year Upgraded
Ventilation:				
Local exhaust	Y	1967	Y	1986
General dilution	N	N/A		
Other (specify)				
_____				
Vessel emission controls	N			
Mechanical loading or packaging equipment	N			
Other (specify)				
_____	N/A			

[ ] Mark (X) this box if you attach a continuation sheet.

9.13 Describe all equipment or process modifications you have made within the 3 years prior to the reporting year that have resulted in a reduction of worker exposure to the listed substance. For each equipment or process modification described, state the percentage reduction in exposure that resulted. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... _____

Work area ..... _____

Equipment or Process Modification	Reduction in Worker Exposure Per Year (%)
Additional Exhaust	UK

[ ] Mark (X) this box if you attach a continuation sheet.

PART D PERSONAL PROTECTIVE AND SAFETY EQUIPMENT

9.14 Describe the personal protective and safety equipment that your workers wear or use in each work area in order to reduce or eliminate their exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... _____

Work area ..... _____

Equipment Types	Wear or Use (Y/N)
Respirators	Y
Safety goggles/glasses	Y
Face shields	N
Coveralls	Y
Bib aprons	N
Chemical-resistant gloves	Y
Other (specify)	
Air-line respirator	Y

[ ] Mark (X) this box if you attach a continuation sheet.

9.15 If workers use respirators when working with the listed substance, specify for each process type, the work areas where the respirators are used, the type of respirators used, the average usage, whether or not the respirators were fit tested, and the type and frequency of the fit tests. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Work Area	Respirator Type	Average Usage[1]	Fit Tested (Y/N)	Type of Fit Test[2]	Frequency of Fit Tests (per year)
1	Supplied Air	B	Y	QL	2
2	Cart. Respirator	B	Y	QL	2
3	Cart. Respirator	E	Y	QL	2

[1]Use the following codes to designate average usage:

A = Daily
B = Weekly
C = Monthly
D = Once a year
E = Other (specify) As needed

[2]Use the following codes to designate the type of fit test:

QL = Qualitative
QT = Quantitative

[ ] Mark (X) this box if you attach a continuation sheet.

PART E WORK PRACTICES

9.19 Describe all of the work practices and administrative controls used to reduce or eliminate worker exposure to the listed substance (e.g., restrict entrance only to authorized workers, mark areas with warning signs, insure worker detection and monitoring practices, provide worker training programs, etc.). Photocopy this
CBI question and complete it separately for each process type and work area.

[ ]

Process type ..... _____

Work area ..... 1 and 2

1.) Respirator Protection 2.) Placecarding
3.) Limited Access 4.) Training Program
5.) Changing rooms and laundering service.

9.20 Indicate (X) how often you perform each housekeeping task used to clean up routine leaks or spills of the listed substance. Photocopy this question and complete it separately for each process type and work area.

N/A

Process type ..... _____

Work area ..... _____

Housekeeping Tasks	Less Than Once Per Day	1-2 Times Per Day	3-4 Times Per Day	More Than 4 Times Per Day
Sweeping				
Vacuuming				
Water flushing of floors				
Other (specify)				
_____				

[ ] Mark (X) this box if you attach a continuation sheet.

9.21 Do you have a written medical action plan for responding to routine or emergency exposure to the listed substance?

Routine exposure

Yes 1

No 2

Emergency exposure

Yes 1

No 2

If yes, where are copies of the plan maintained?

Routine exposure: _____

Emergency exposure: _____

9.22 Do you have a written leak and spill cleanup plan that addresses the listed substance? Circle the appropriate response.

(Yes) 1

No 2

If yes, where are copies of the plan maintained? Office

Has this plan been coordinated with state or local government response organizations? Circle the appropriate response.

(Yes) 1

No 2

9.23 Who is responsible for monitoring worker safety at your facility? Circle the appropriate response.

(Plant safety specialist) 1

Insurance carrier 2

OSHA consultant 3

Other (specify) _____ 4

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 10 ENVIRONMENTAL RELEASE

General Instructions:

Complete Part E (questions 10.23-10.35) for each non-routine release involving the listed substance that occurred during the reporting year. Report on all releases that are equal to or greater than the listed substance's reportable quantity value, RQ, unless the release is federally permitted as defined in 42 U.S.C. 9601, or is specifically excluded under the definition of release as defined in 40 CFR 302.3(22). Reportable quantities are codified in 40 CFR Part 302. If the listed substance is not a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and, thus, does not have an RQ, then report releases that exceed 2,270 kg. If such a substance however, is designated as a CERCLA hazardous substance, then report those releases that are equal to or greater than the RQ. The facility may have answered these questions or similar questions under the Agency's Accidental Release Information Program and may already have this information readily available. Assign a number to each release and use this number throughout this part to identify the release. Releases over more than a 24-hour period are not single releases, i.e., the release of a chemical substance equal to or greater than an RQ must be reported as a separate release for each 24-hour period the release exceeds the RQ.

For questions 10.25-10.35, answer the questions for each release identified in question 10.23. Photocopy these questions and complete them separately for each release.

PART A GENERAL INFORMATION

10.01 Where is your facility located? Circle all appropriate responses.

CBI

[ ] Industrial area 1

Urban area 2

Residential area 3

Agricultural area 4

Rural area 5

Adjacent to a park or a recreational area 6

Within 1 mile of a navigable waterway 7

Within 1 mile of a school, university, hospital, or nursing home facility 8

Within 1 mile of a non-navigable waterway 9

Other (specify) _____ 10

[ ] Mark (X) this box if you attach a continuation sheet.

10.02 Specify the exact location of your facility (from central point where process unit is located) in terms of latitude and longitude or Universal Transverse Mercader (UTM) coordinates. N/A

Latitude ..... ____ ° ____ ' ____ "

Longitude ..... ____ ° ____ ' ____ "

UTM coordinates ..... Zone ____, Northing ____, Easting ____

10.03 If you monitor meteorological conditions in the vicinity of your facility, provide the following information.

Average annual precipitation ..... ____ ____ inches/year

Predominant wind direction ..... ____

10.04 Indicate the depth to groundwater below your facility.

Depth to groundwater ..... ____ meters

10.05 For each on-site activity listed, indicate (Y/N/NA) all routine releases of the listed substance to the environment. (Refer to the instructions for a definition of Y, N, and NA.)

CBI

[ ]

On-Site Activity	Environmental Release		
	Air	Water	Land
Manufacturing	N/A		
Importing	N/A		
Processing	Y	N	N
Otherwise used	N		
Product or residual storage	N		
Disposal	N		
Transport	N		

[ ] Mark (X) this box if you attach a continuation sheet.

10.06 Provide the following information for the listed substance and specify the level of precision for each item. (Refer to the instructions for further explanation and an example.)

CBI

[ ]

Quantity discharged to the air	UK	kg/yr ± ___ %
Quantity discharged in wastewaters	0	kg/yr ± ___ %
Quantity managed as other waste in on-site treatment, storage, or disposal units	0	kg/yr ± ___ %
Quantity managed as other waste in off-site treatment, storage, or disposal units	0	kg/yr ± ___ %

[ ] Mark (X) this box if you attach a continuation sheet.

10.08 Describe the control technologies used to minimize release of the listed substance for each process stream containing the listed substance as identified in your process block or residual treatment block flow diagram(s). Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Stream ID Code	Control Technology	Percent Efficiency
7A	None	0

[ ] Mark (X) this box if you attach a continuation sheet.

PART B RELEASE TO AIR

10.09 Point Source Emissions -- Identify each emission point source containing the listed substance in terms of a Stream ID Code as identified in your process block or residual treatment block flow diagram(s), and provide a description of each point source. Do not include raw material and product storage vents, or fugitive emission sources (e.g., equipment leaks). Photocopy this question and complete it separately for each process type.

CBI
[ ]

Process type ..... _____

Point Source ID Code	Description of Emission Point Source
7A	Exhaust vent

[ ] Mark (X) this box if you attach a continuation sheet.

10.10 Emission Characteristics - - Characterize the emissions for each Point Source ID Code identified in question 10.09 by completing the following table.

CBI

[ ]

Point Source ID Code	Physical State[1]	Average Emissions (kg/day)	Frequency[2] (days/yr)	Duration[3] (min/day)	Average Emission Factor[4]	Maximum Emission Rate (kg/min)	Maximum Emission Rate Frequency (events/yr)	Maximum Emission Rate Duration (min/event)
7A	V	UK	104	480	UK	UK	UK	UK

[1]Use the following codes to designate physical state at the point of release:
G = Gas; V = Vapor; P = Particulate; A = Aerosol; O = Other (specify) _____

[2]Frequency of emission at any level of emission

[3]Duration of emission at any level of emission

[4]Average Emission Factor — Provide estimated (± 25 percent) emission factor (kg of emission per kg of production of listed substance)

[ ] Mark (X) this box if you attach a continuation sheet.

10.11 Stack Parameters -- Identify the stack parameters for each Point Source ID Code identified in question 10.09 by completing the following table.

CBI

[ ]

Point Source ID Code	Stack Height(m)	Stack Inner Diameter (at outlet) (m)	Exhaust Temperature (°C)	Emission Exit Velocity (m/sec)	Building Height(m)[1]	Building Width(m)[2]	Vent Type[3]

[1]Height of attached or adjacent building

[2]Width of attached or adjacent building

[3]Use the following codes to designate vent type:

H = Horizontal
V = Vertical

[ ] Mark (X) this box if you attach a continuation sheet.

10.12 If the listed substance is emitted in particulate form, indicate the particle size distribution for each Point Source ID Code identified in question 10.09. Photocopy this question and complete it separately for each emission point source.

CBI

[ ]

N/A

Point source ID code ..... _____

Size Range (microns)	Mass Fraction (% ± % precision)
< 1	
≥ 1 to < 10	
≥ 10 to < 30	
≥ 30 to < 50	
≥ 50 to < 100	
≥ 100 to < 500	
≥ 500	

Total = 100%

[ ] Mark (X) this box if you attach a continuation sheet.

PART C FUGITIVE EMISSIONS

10.13 Equipment Leaks -- Complete the following table by providing the number of equipment types listed which are exposed to the listed substance and which are in service according to the specified weight percent of the listed substance passing through the component. Do this for each process type identified in your process block or residual treatment block flow diagram(s). Do not include equipment types that are not exposed to the listed substance. If this is a batch or intermittently operated process, give an overall percentage of time per year that the process type is exposed to the listed substance. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Percentage of time per year that the listed substance is exposed to this process type ..... _____ %

Equipment Type	Number of Components in Service by Weight Percent of Listed Substance in Process Stream					
	Less than 5%	5-10%	11-25%	26-75%	76-99%	Greater than 99%
Pump seals[1]						
Packed	1					
Mechanical	N/A					
Double mechanical[2]	N/A					
Compressor seals[1]	N/A					
Flanges	N/A					
Valves						
Gas[3]	N/A					
Liquid						1
Pressure relief devices[4] (Gas or vapor only)	N/A					
Sample connections						
Gas	N/A					
Liquid	N/A					
Open-ended lines[5] (e.g., purge, vent)						
Gas						1
Liquid						

[1] List the number of pump and compressor seals, rather than the number of pumps or compressors

10.13 continued on next page

[ ] Mark (X) this box if you attach a continuation sheet.

10.13 (continued)

[2]If double mechanical seals are operated with the barrier (B) fluid at a pressure greater than the pump stuffing box pressure and/or equipped with a sensor (S) that will detect failure of the seal system, the barrier fluid system, or both, indicate with a "B" and/or an "S", respectively

[3]Conditions existing in the valve during normal operation

[4]Report all pressure relief devices in service, including those equipped with control devices

[5]Lines closed during normal operation that would be used during maintenance operations

10.14 Pressure Relief Devices with Controls -- Complete the following table for those pressure relief devices identified in 10.13 to indicate which pressure relief devices in service are controlled. If a pressure relief device is not controlled, enter "None" under column c.

CBI

[ ]

N/A

a. Number of Pressure Relief Devices	b. Percent Chemical in Vessel[1]	c. Control Device	d. Estimated Control Efficiency[2]

[1]Refer to the table in question 10.13 and record the percent range given under the heading entitled "Number of Components in Service by Weight Percent of Listed Substance" (e.g., <5%, 5-10%, 11-25%, etc.)

[2]The EPA assigns a control efficiency of 100 percent for equipment leaks controlled with rupture discs under normal operating conditions. The EPA assigns a control efficiency of 98 percent for emissions routed to a flare under normal operating conditions

[ ] Mark (X) this box if you attach a continuation sheet.

10.15 Equipment Leak Detection -- If a formal leak detection and repair program is in place, complete the following table regarding those leak detection and repair procedures. Photocopy this question and complete it separately for each process type.

N/A

CBI

[ ] Process type ..... _____

Equipment Type	Leak Detection Concentration (ppm or mg/m^3) Measured at ____ Inches from Source	Detection Device[1]	Frequency of Leak Detection (per year)	Repairs Initiated (days after detection)	Repairs Completed (days after initiated)
Pump seals					
Packed					
Mechanical					
Double mechanical					
Compressor seals					
Flanges					
Valves					
Gas					
Liquid					
Pressure relief devices (gas or vapor only)					
Sample connections					
Gas					
Liquid					
Open-ended lines					
Gas					
Liquid					

[1]Use the following codes to designate detection device:

POVA = Portable organic vapor analyzer
FPM = Fixed point monitoring
O = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

10.16 Raw Material, Intermediate and Product Storage Emissions - - Complete the following table by providing the information on each liquid raw material, intermediate, and product storage vessel containing the listed substance as identified in your process block or residual treatment block flow diagram(s). N/A

CBI

[ ]

Vessel Type[1]	Floating Roof Seals[2]	Composition of Stored Materials[3]	Throughput (liters per year)	Vessel Filling Rate (gpm)	Vessel Filling Duration (min)	Vessel Inner Diameter (m)	Vessel Height (m)	Operating Vessel Volume (l)	Vessel Emission Controls[4]	Design Flow Rate[5]	Vent Diameter (cm)	Control Efficiency (%)	Basis for Estimate[6]

[1]Use the following codes to designate vessel type:

F = Fixed roof
CIF = Contact internal floating roof
NCIF = Noncontact internal floating roof
EFR = External floating roof
P = Pressure vessel (indicate pressure rating)
H = Horizontal
U = Underground

[2]Use the following codes to designate floating roof seals:

MS1 = Mechanical shoe, primary
MS2 = Shoe-mounted secondary
MS2R = Rim-mounted, secondary
LM1 = Liquid-mounted resilient filled seal, primary
LM2 = Rim-mounted shield
LMW = Weather shield
VM1 = Vapor mounted resilient filled seal, primary
VM2 = Rim-mounted secondary
VMW = Weather shield

[3]Indicate weight percent of the listed substance. Include the total volatile organic content in parenthesis

[4]Other than floating roofs

[5]Gas/vapor flow rate the emission control device was designed to handle (specify flow rate units)

[6]Use the following codes to designate basis for estimate of control efficiency:

C = Calculations
S = Sampling

[ ] Mark (X) this box if you attach a continuation sheet.

PART E NON-ROUTINE RELEASES

10.23 Indicate the date and time when the release occurred and when the release ceased or was stopped. If there were more than six releases, attach a continuation sheet and list all releases.

Release	Date Started	Time (am/pm)	Date Stopped	Time (am/pm)
1	0	0	0	0
2				
3				
4				
5				
6				

10.24 Specify the weather conditions at the time of each release.

Release	Wind Speed (km/hr)	Wind Direction	Humidity (%)	Temperature (°C)	Precipitation (Y/N)
1					
2					
3					
4					
5					
6					

[ ] Mark (X) this box if you attach a continuation sheet.

APPENDIX II: Substantiation Form and Instructions to Accompany Claims of Confidentiality Under the Comprehensive Assessment Information Rule (CAIR)

If you assert one or more claims of confidentiality for information submitted on a Comprehensive Assessment Information Rule (CAIR) form, please answer, pursuant to 40 CFR 740.219, all the following questions in the space provided. Type all responses. If you need more space to answer a particular question, please use additional sheets. If you use additional sheets, be sure to include the section, number, and (if applicable) subpart of the question being answered, and write your facility's name and Dun & Bradstreet Number in the lower right-hand corner of each sheet. A completed copy of this form must accompany all submissions containing one or more claims of confidentiality. Failure to do so will result in the waiver of your claim of confidentiality.

EPA has identified six information categories as those which encompass all claims of confidentiality. These are: Submitter identity (h); Substance identity (i); Volume manufactured, imported, or processed (j); Use information (k); Process information (l); and Other information (m). Respondents who assert a CBI claim on the reporting form must mark the letter(s) (h through m) that represent(s) the appropriate category(ies) of confidentiality in the box adjacent to the question, and answer the questions in this form.

Respondents who assert a CBI claim for information submitted under CAIR must also provide EPA with sanitized and unsanitized versions of their submissions. The unsanitized version must be complete and contain all information being claimed as confidential. The sanitized copy must contain only information not claimed as confidential. EPA will place the second copy of the submission in the public file. Failure to submit the second copy of the form at the time the respondent submits the reporting form containing confidential information or after receipt of a notice from EPA thereafter will result in a waiver of the respondent's claim of confidentiality.

Please indicate the CAS Registry Number (if known) or chemical name (if the CAS Registry Number is not known) for the substance that is the subject of this form:

_____

If you are reporting on a tradename, please provide the tradename for the substance that is the subject of this form:

_____

Does this form contain CBI? [X] Yes [ ] No

If the answer to this question is yes, you must bracket the text claimed as CBI. Any unbracketed information may be placed in the public file.

[ ] Mark (X) this box if you attach a continuation sheet.

A. All Claims. Respondents who assert any CBI claims must answer the following questions in addition to the appropriate questions from sections B through G, below:

(1) For what period do you assert a claim of confidentiality? If a claim is to extend until a certain event or point in time, please indicate that event or time period. If the period indicated is longer than 2 calendar years, explain why. If different periods of protection are required for different categories of information, please so indicate.

(2) Has the information that you are claiming as confidential been or will it be disclosed to individuals outside your company?

[ ] Yes [ ] No

If so, what, if any, restrictions apply to the use or further disclosure of the information?

(3) Briefly describe the physical and procedural restrictions, if any, within your company on the use and storage of the information you are claiming as confidential. What other steps have you taken to prevent the undesired disclosure of the information by others?

(4) Does the information you are claiming as confidential appear or is it referred to in advertising, promotional, or safety materials for the substance or an end-product containing the substance?

[ ] Yes [ ] No

Does it appear or is it referred to in professional or trade publications?

[ ] Yes [ ] No

If so, indicate why the information should nonetheless be considered confidential.

[ ] Mark (X) this box if you attach a continuation sheet.

(5) If the information you wish to claim as confidential were to be disclosed to the public by EPA, how much difficulty would a new competitor have in entering the market for this substance, considering such constraints as capital and marketing costs, specialized marketing expertise, or unusual production processes?

Moderatly

(6) Has EPA, another Federa
determinations for informat

[ ] Yes [ ] No NO

If so, please identify the

B. Submitter Identity (code h). Respondents who assert CBI claims for submitter identity must also answer the following questions:

(1) Approximately how many competitors do you have in the market for this substance or the final product containing this substance?

(2) What harm, if any, would result from EPA's disclosure of the submitter identity? Provide detailed descriptions of both the probable harm from disclosure and the causal relationship between disclosure and harm.

(3) If you have also asserted a claim of confidentiality for substance identity, what harm to your company's competitive position would result from disclosure of your company's identity if the substance identity were to remain confidential?

[ ] Mark (X) this box if you attach a continuation sheet.

C. Substance Identity (code i). Specific substance identity can be claimed as confidential only if that substance identity is confidential for purposes of the TSCA Chemical Substance Inventory. Respondents who assert CBI claims for substance identity must also answer the following questions:

(1) (a) Has the substance been patented or disclosed in a patent in the U.S. or elsewhere?

[ ] Yes [ ] No

If so, indicate the relevant patent(s) and the reasons why the substance identity should nonetheless be considered confidential.

Patent Number: _____

(b) Exactly what information which does not appear in the patent would be disclosed to competitors by releasing the specific substance identity? Explain in detail how competitors could use this information.

(c) Since the patent provides protection for the substance, why are you asserting confidentiality?

(2) (a) In what form (i.e., product, effluent, emission, etc.) does this substance leave your site?

(b) What measures have you taken to guard against the discovery of the substance identity by others?

[ ] Mark (X) this box if you attach a continuation sheet.

(c) If the substance is formulated with other chemicals, list them, and state the concentration of the claimed substance in the mixture.

(3) (a) If the substance leaves the site in a product that is available to the public or your competitors, can the substance be identified by analysis of the product?

[ ] Yes [ ] No

(b) Is it likely that a competitor has attempted or will attempt to chemically analyze the substance?

[ ] Yes [ ] No

(c) Would the cost and difficulty of such analysis be great or small? Why?

(4) What harm, if any, would result from EPA's public disclosure of the specific chemical identity? Provide detailed descriptions of both the probable harm to your company from disclosure and the causal relationship between release and harm.

(5) Would public disclosure of the specific chemical identity reveal to your competitors the use of the substance or the process by which this substance is manufactured?

[ ] Mark (X) this box if you attach a continuation sheet.

D. Volume Manufactured, Imported, or Processed (code j). Respondents who assert CBI claims for volume manufactured, imported, or processed must also answer the following questions:

(1) If you have also claimed submitter's name as confidential and EPA keeps confidential the link between your company identity and the volume manufactured, imported, or processed, your identity will not be associated in any way with that volume. In this case, what harm to your company's competitive position would result from disclosing that volume? How could a competitor use this information? What is the causal relationship between the disclosure and the harm?

(2) If you have also claimed substance identity as confidential and EPA keeps confidential the link between the substance identity and the volume manufactured, imported, or processed, the substance identity will not be associated in any way with that volume. In this case, what harm to your company's competitive position would result from disclosing that volume? How could a competitor use that information? What is the causal relationship between the disclosure and the harm?

(3) If you have claimed neither submitter nor substance identity as confidential, what harm, if any, would result from release of your volume manufactured, imported, or processed? Provide a detailed description of both the harm and the causal relationship between disclosure and harm.

E. Use Information (code k). Respondents who assert CBI claims for use information must also answer the following questions:

(1) If you have also claimed submitter identity as confidential and EPA keeps confidential the link between your company identity and the use data, your identity will not be associated in any way with the use data. In this case, what harm to your competitive position would result from disclosing the use data? How could a competitor use this information? What is the causal relationship between the disclosure and the harm?

[ ] Mark (X) this box if you attach a continuation sheet.

(2) If you have also claimed substance identity as confidential and EPA keeps confidential the link between the substance identity and the use data, the substance identity will not be associated in any way with the use data. In this case, what harm to your company's competitive position would result from disclosing the use data? How could a competitor use this information? What is the causal relationship between the disclosure and the harm?

(3) If you have claimed neither submitter nor substance identity as confidential, what harm, if any, would result from release of your use information? Provide a detailed description of both the harm and the causal relationship between disclosure and harm.

F. Process information (code 1). Respondents who assert CBI claims for process information must also answer the following questions:

(1) If you have also claimed submitter identity as confidential and EPA keeps confidential the link between your company identity and process information, your identity will not be associated in any way with this information. In this case, what harm to your competitive position would result from disclosing the process information? How could a competitor use this information? What is the causal relationship between the disclosure and the harm?

(2) If you have also claimed substance identity as confidential and EPA keeps confidential the link between the substance identity and the process information, the substance identity will not be associated in any way with the process information. In this case, what harm to your company's competitive position would result from disclosing the process information? How could a competitor use this information? What is the causal relationship between the disclosure and the harm?

[ ] Mark (X) this box if you attach a continuation sheet.

(3) If you claimed neither submitter nor substance identity as confidential, what harm, if any, would result from release of your process information? Provide a detailed description of both the harm and the causal relationship between the disclosure and the harm.

G. Other information (code m). Respondents who assert CBI claims using the "other information" category, must also answer the following questions:

(1) Is the item confidential in and of itself, or is it confidential because it will reveal some other confidential information, whether or not that other information is reported on this form? If the latter, what is the information that will be revealed, and how would disclosure of the item in turn lead to disclosure of the other information?

(2) Describe with specificity the harm to your company's competitive position which would result from disclosing the information.

(3) If you have also claimed submitter identity as confidential and EPA keeps confidential the link between your company identity and this information, your identity will not be associated in any way with the item claimed. In this case, what harm to your competitive position would result from disclosing the item? How could a competitor use this information? What is the causal relationship between the disclosure and the harm?

(4) If you have also claimed substance identity as confidential and EPA keeps confidential the link between the substance identity and the item, the substance identity (other than category name) will not be associated in any way with the item claimed. In this case, what harm to your company's competitive position would result from disclosing the item? How could a competitor use this information? What is the causal relationship between the disclosure and the harm?

[ ] Mark (X) this box if you attach a continuation sheet.

MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: POLYURETHANE
Trade Name : URETHANE 45
Product Code : R0-032
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: Health - 3
none -> extreme Fire - 3
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV	Exposure Limits OSHA/PEL	VP mm HG
XYLENE	1330-20-7	50-75	100 ppm S.T.E.L.= 150	100	25.
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4					
PM ACETATE	108-65-6	1-5	Undetermined		3.8
THE MANUFACTURER OF THE ABOVE ITEM LISTS 'NONE' FOR TLV					
POLYPROPYLENE GLYCOL	25322-69-4	1-5	Undetermined		
PRODUCT IS A LOW HAZARD LIQUID.					
TOLUENE DIISOCYANATE	26477-62-5	< 1.	.01 ppm	.02	0.
THE ABOVE AROMATIC ISOCYANATE CONSISTS OF: 80% 2,4 TOLUENE DIISOCYANATE CAS NO 584-84-9; 20% 2,6 TOLUENE DIISOCYANATE CAS NO 91-08-7					
The indicated TLV is 0.005 ppm ACGIH, 1983					
In a National Toxicology Program (NTP) study, this material was carcinogenic when given orally to rats and mice at maximum tolerated doses. THIS MATERIAL WAS NOT CARCINOGENIC TO RATS IN A TWO YEAR INHALATION STUDY. Based on the results of the ORAL study, this material was included in the NTP annual report on Carcinogens.					
URETHANE CATALYST	77-58-7	< 1.	.1 ppm		
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3					
CYCLOHENANONE	108-94-1	< 1.	25 ppm	50	2.
THE ABOVE ITEM HAS A 50 PPM PEL (OSHA) AT 200 MG/M3 TWA THE ACGIH TLV (1985-1986) IS 25 PPM AT 100 MG/M3 TWA (SKIN)					

SECTION III - PHYSICAL DATA

Boiling Range: 157 - 552 Deg. F
Evap. Rate: 0.59 x n-Butyl Acetate
Volatiles volume: 60.6 %
Appearance: CLEAR LIQUID

Vapor Density: Heavier than Air.
Liquid Density: Lighter than Water.
Wgt per gallon: 8.08 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: 77 F SETA LEL : 1. %

-EXTINGUISHING MEDIA:

FOAM, CO2, OR DRY CHEMICAL

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET

DO NOT ENTER FIRE AREA WITHOUT PROPER PROTECTION BECAUSE HAZARDOUS DECOMPOSITION PRODUCTS MAY BE PRESENT. (SEE VI)

-UNUSUAL FIRE & EXPLOSION HAZARDS:

WATER PRESSURE MAY SPREAD A FLAMMABLE LIQUID FIRE.

SEALED CONTAINERS MAY EXPLODE IF OVERHEATED.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

IF PEL'S ARE KNOWN, THEY ARE LISTED IN SECT. II

W A R N I N G CARE MUST BE TAKEN NOT TO EXCEED THE EXPOSURE LIMIT FOR THE LOWEST TLV SHOWN IN SECTION II. WHEN IN DOUBT, WEAR AN APPROVED RESPIRATOR AND ORDER AIR SAMPLING TESTS.

BY ANALOGY TO OTHER SIMILAR MATERIALS, THIS PRODUCT HAS THE POTENTIAL FOR SIGNIFICANT SKIN ABSORBTION. THERE IS NO KNOWN DATA TO INDICATE POTENTIAL TOXICITY UNDER PROLONGED/REPEATED EXPOSURE.

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.

OVEREXPOSURE TO AROMATIC ISOCYANATES WILL CAUSE IRRITATION TO THE RESPIRATORY TRACT (DRY THROAT, COUGH, SHORTNESS OF BREATH, CHEST TIGHTNESS) RESULTING IN SINUSITIS, BRONCHITIS AND ASTHMA-LIKE SYMPTOMS.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF CLEAN LUKEWARM LOW PRESSURE WATER FOR 15 MIN., OCCASIONALY LIFTING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION. KEEP VICTOM QUIET. NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSION LIQUIDS.
IF THE VICTOM HAS INGESTED LARGE QUANTITIES, AND IS COMPLETELY CONSCIOUS/ALERT, THEN ADMINISTER LUKEWARM WATER (PINT).

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION

(cont.)

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)
PERSISTS, GET MEDICAL ATTENTION.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur
-INCOMPATABILITY:
MAY BE INCOMPATIBLE WITH OXIDIZING AGENTS AND STRONG ALKALIES.
-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE
HIGH TEMPERATURE, STRONG OXIDIZING CONDITIONS, EXTENDED
CONTACT WITH AIR/OXYGEN.
WARNING: Do not spray-apply this material.
-HAZARDOUS DECOMPOSITION PRODUCTS:
INCOMPLETE COMBUSTION FOR PRODUCTS LIKE THIS MAY GENERATE
HIGHLY POISONOUS CARBON MONOXIDE AND OTHER TOXIC GASES.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
WARNING - FLAMMABLE. ELIMINATE ALL IGNITION SOURCES.
HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING.
SOAK UP WITH AN ABSORBENT AND PLACE IN NON-LEAKING
CONTAINERS. SEAL TIGHTLY FOR PROPER DISPOSAL.
-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND
FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-MUST PROVIDE ADEQUATE VENTILATION TO MAINTAIN VAPOR
CONCENTRATIONS BELOW THE ESTABLISHED TLV LIMIT AS GIVEN BY OSHA.
IN MORE CONFINED AREAS A NIOSH-MSHA APPROVED RESPIRATOR EQUIPPED
WITH ORGANIC VAPOR CARTRIDGE SHOULD BE WORN.
BECAUSE THIS MATERIAL CONTAINS AROMATIC ISOCYANATES, THOSE
INDIVIDUALS HAVING A HISTORY OF RESPIRATORY ILLNESS OR
ASTHMATIC CONDITIONS SHOULD BE PRECLUDED FROM EXPOSURE.
WARNING:Do not spray-apply this material.
-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.
-PROTECTIVE GLOVES:
USE RUBBER GLOVES
-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD.
-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AVAILABLE

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

TREAT AS A HAZARDOUS-FLAMMABLE MATERIAL.
KNOW APPLICABLE D.O.T REGULATIONS BEFORE ATTEMPTING TO TRANSPORT THIS MATERIAL.
WARNING: Do not spray-apply this material.

-OTHER PRECAUTIONS:

N O T E

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc. it is the user's obligation to determine the conditions of safe use of this product.

Crawford Laboratories Inc. makes no warranty, expressed or implied, as to the accuracy of the information and opinions, and assumes no responsibility for any damage to person, property or business arising from such use.

text01

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609
Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

MATERIAL SAFETY DATA SHEET

PRODUCT NUMBER: RO-079

SECTION I

TRADE NAME: ASAHI BASE	Hazard Ratings: none -> extreme 0 ---> 4
PRODUCT CLASS: PREPOLYMER BASE	Health - 3
PRODUCT CODE: RO-079	Fire - 1
C.A.S. NUMBER: SEE BELOW	Reactivity - 1

SECTION II - INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV	OSHA/PEL	VP mm HG
TOLUENE DIISOCYANATE	SEE BELOW	33	.01 ppm	.02	0.

THE ABOVE AROMATIC ISOCYANATE CONSISTS OF:
80% 2,4 TOLUENE DIISOCYANATE CAS NO 584-84-9
20% 2,6 TOLUENE DIISOCYANATE CAS NO 91-08-7
The indicated TLV is 0.005 ppm ACGIH, 1983
In a National Toxicology Program (NTP) study, this material was carcinogenic when given orally to rats and mice at maximum tolerated doses. THIS MATERIAL WAS NOT CARCINOGENIC TO RATS IN A TWO YEAR INHALATION STUDY. Based on the results of the ORAL study, this material was included in the NTP annual report on Carcinogens.

SECTION III - PHYSICAL DATA

BOILING/MELTING POINT 484 - 484 Deg. F	LIQUID DENISTY: Heavier than water
EVAP. RATE: n-Butyl Acetate	Vapor Density HEAVIER THAN Air
VOLATILES VOLUME: 0.0%	WGT. PER GALLON: 9.11 lbs.
APPEARANCE: CLEAR LIQUID	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TEST METHOD): 270 F TAG Open Cup	AUTOIGNITION TEMP: N/A
FLAMMABILITY LIMITS IN AIR (% BY VOL) LOWER: 0.9%	UPPER: 9.5%
EXTINGUISHING MEDIUM	Use water fog, foam or CO2 extinguishing media.
SPECIAL FIREFIGHTING PROCEDURES	Personnel engaged in fighting isocyanate fires must be protected against nitrogen dioxide fumes as well as isocyanate vapors. Firefighters must wear self-contained
UNUSUAL FIRE AND EXPLOSION HAZARDS	breathing apparatus and turnout gear. Avoid water contamination in closed containers or confined areas; carbon dioxide gas is generated.

SECTION V – HEALTH DATA

TOXICOLOGICAL	RESULT:
PREPOLYMER BASE	
2,4 Toluene Diisocyanate	Severe eye and skin irritant, sensitizer
Rat, Oral LD50	5.8 g/kg.
Mouse, Inhalation LC50	10 ppm/4H

EFFECTS OF OVEREXPOSURE:

Inhalation of the vapors causes severe irritation to lungs, and pulmonary edema can occur after a serious vapor exposure.
Liquid contact causes serious skin and eye burns.
Pulmonary sensitization can occur in some individuals leading to asthma-type spasms of the bronchial tubes and difficulty in breathing.
Preclude from exposure those individuals having a history of respiratory illness, asthmatic conditions, eye damage or TDI sensitization.
Recent studies indicate that overexposure may be associated with chronic lung impairment.
In a National Toxicology Program (NTP) study, TDI was carcinogenic when given orally to rats and mice at maximum tolerated doses.
TDI was not carcinogenic to rats in a two-year inhalation study.
Based on the results of the oral study, TDI was included in the NTP Annual Report on Carcinogens.

FIRST AID PROCEDURES:

Eyes--Flush eyes with flowing water for at least 15 minutes
If irritation develops, consult a physician.
Skin--Wash affected skin areas thoroughly with soap and water.
Remove clothing and launder contaminated clothing before reuse. If irritation develops, consult a physician.
Ingestion--If swallowed, dilute with water.
Do NOT induce vomiting.
Never give fluids or induce vomiting if the victim is unconscious or having convulsions.
Get medical attention immediately.
Inhalation--If inhaled, move to fresh air. Aid in breathing if necessary, and get medical attention.

SECTION VI – REACTIVITY DATA

STABILITY: Stable.
CONDITIONS TO AVOID: Avoid temperatures >40 C for extended periods of time.

CHEMICAL INCOMPATIBILITY: Basic compounds, caustic soda, tertiaryamines, water

HAZARDOUS DECOMPOSITION PRODUCTS: TDI vapors, NOx, CO and HCN.

HAZARDOUS POLYMERIZATION: May occur. Avoid contamination with moisture
CONDITIONS TO AVOID: and other products that react with isocyanates.

CORROSIVE TO METAL: No | OXIDIZER: No

SECTION VII – SPECIAL PROTECTION

RESPIRATORY PROTECTION:
Approved respirator for transferring operations or escape.
Self-contained breathing apparatus if the P.E.L. is exceeded, or in confined areas or if a leak occurs.

EYE PROTECTION: Wear fitted goggles or face shield and safety glasses.

PROTECTIVE CLOTHING: Rubber gloves, coveralls, boots and rubber apron which must be cleaned after each use.

VENTILATION: Use local exhaust wherever vapors are generated.

OTHER: Maintain work area below P.E.L.

SECTION VIII - ENVIRONMENTAL DATA

ENVIRONMENTAL TOXICITY DATA:

Aquatic toxicity rating: TLm 96: 10 ppm - 1 ppm.

SPILL AND LEAK PROCEDURES:

Wear protective clothing. evacuate all not involved in the cleanup. For minor spills, absorb with absorbent and containerize into open top drums. Decontaminate spill area with a mixture of 90% water, 8% concentrated ammonia and 2% detergent. Dispose of

HAZARDOUS SUBSTANCE SUPERFUND: Yes RQ (lbs): 100

WASTE DISPOSAL METHOD:

waste in a RCRA-permitted facility.
Incinerate or landfill in a RCRA-permitted facility.

CONTAINER DISPOSAL:

Containers should be neutralized with liquid decontaminant. Empty containers, containing less than 1" of residue, may be landfilled. If containers are not empty, they must be disposed as a hazardous waste in a RCRA-licensed facility.

SECTION IX - SHIPPING DATA

D.O.T. PROPER SHIPPING NAME (49CFR172.101-102)	HAZARDOUS SUBSTANCE (49CFR CERCLA LIST)
TOLUENE DIISOCYANATE SOLUTION	Yes
	REPORTABLE QUANTITY (RQ) 1.0 lb

D.O.T. HAZARD CLASSIFICATION (CFR172.101-102) PRIMARY	SECONDARY
Poison B	

D.O.T. LABELS REQUIRED (49CFR172.101-102)	D.O.T. PLACARDS REQUIRED (CFR172.504)	POISON CONSTITUENT (49CFR172.203(K))
Poison	Poison	TDI

BILL OF LADING DESCRIPTION

TOLUENE DIISOCYANATE SOLUTION, POISIN B (UN2078)

NOTE

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SECTION X - PRODUCT LABEL

PREPOLYMER BASE

DANGER: POISON
CONTACT WITH EYES AND SKIN RESULTS IN SERIOUS BURNS. INHALATION OF VAPORS CAUSES SEVERE IRRITATION TO LUNGS. PULMONARY EDEMA MAY OCCUR. PULMONARY SENSITIZATION CAN OCCUR IN SOME INDIVIDUALS, LEADING TO ASTHMA-TYPE SPASMS OF THE BRONCHIAL TUBES AND DIFFICULTY IN BREATHING. INDIVIDUALS WITH A HISTORY OF RESPIRATORY ILLNESS, ASTHMATIC CONDITIONS, EYE DAMAGE OR TDI SENSITIZATION SHOULD NOT BE EXPOSED TO THIS PRODUCT.
IN AN NTP STUDY, TDI WAS CARCINOGENIC TO RODENTS GIVEN HIGH ORAL DOSES AND IS INCLUDED IN THE NTP ANNUAL REPORT ON CARCINOGENS. TDI WAS NOT CARCINOGENIC TO RATS IN A TWO-YEAR INHALATION STUDY.

Use with local exhaust. Wear an approved respirator or self-contained breathing apparatus, fitted goggles or face shield and safety glasses, rubber gloves, coveralls, boots, apron and other protective clothing as necessary to prevent contact.

FIRST AID:
Eyes-Immediately wash eyes with running water for 15 minutes. If irritation develops, consult a physician.
Skin-Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. If irritation develops, consult a physician.
Ingestion-If swallowed, DO NOT INDUCE VOMITING. Dilute with water or milk and call a physician immediately. Never give fluids or induce vomiting if the victim is unconscious or having convulsions.
Inhalation-Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

HANDLING AND STORAGE: Keep containers closed and store in a well-ventilated cool, dry place. Outage of any partial container should be filled with dry inert gas at atmospheric pressure to avoid reaction with moisture. Contamination by moisture or basic compounds can cause dangerous pressure buildup in a closed container. Store above 60 F to prevent freezing and isomer separation. If solidified, do not exceed 95 F while thawing to prevent discoloration. Mix before using. Use only ventilation which will keep the vapor concentration below the TLV ceiling limit of 0.02 ppm.

IN CASE OF SPILLS OR LEAKS: Material is a RCRA-regulated product. Spills should be contained, absorbed and placed in suitable containers for disposal in a RCRA-licensed facility.

IN CASE OF FIRE: Use water fog, foam or CO2 extinguishing media. Firefighters should be equipped with self-contained breathing apparatus and turnout gear for protection against TDI vapors and toxic decomposition products.

EMPTY CONTAINERS: All labeled precautions must be observed when handling, storing and transporting empty containers due to product residues. Do not reuse this container unless it is professionally cleaned and reconditioned.

DISPOSAL: Spilled material, unused contents and empty containers must be disposed of in accordance with local, state and federal regulations. Refer to our Material Safety Data Sheet for specific disposal instructions.

MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: M.C. URETHANE
Trade Name : FLOROTHANE
Product Code : RO-002
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: Health - 3
none -> extreme Fire - 3
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV	Exposure Limits OSHA/PEL	VP mm HG
POLYPROPYLENE GLYCOL	25322-69-4	1-5	Undetermined		
PRODUCT IS A LOW HAZARD LIQUID.					
TOLUENE	108-88-3	< 1.	100 ppm	100	38.
THE ABOVE ITEM CONTAINS A TRACE OF BENZENE					
PM ACETATE	108-65-6	5-20	Undetermined		3.8
THE MANUFACTURER OF THE ABOVE ITEM LISTS 'NONE' FOR TLV					
XYLENE	1330-20-7	20-50	100 ppm S.T.E.L.= 150	100	25.
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE					
WHICH IS C.A.S. #100-41-4					
BENZOYL CHLORIDE	98-88-4	< 1.	Undetermined		1.
TOLUENE DIISOCYANATE	26477-62-5	< 1.	.01 ppm	.02	0.
THE ABOVE AROMATIC ISOCYANATE CONSISTS OF:					
80% 2,4 TOLUENE DIISOCYANATE CAS NO 584-84-9					
20% 2,6 TOLUENE DIISOCYANATE CAS NO 91-08-7					
The indicated TLV is 0.005 ppm ACGIH, 1983					
In a National Toxicology Program (NTP) study, this material was carcinogenic when given orally to rats and mice at maximum tolerated doses. THIS MATERIAL WAS NOT CARCINOGENIC TO RATS IN A TWO YEAR INHALATION STUDY. Based on the results of the ORAL study, this material was included in the NTP annual report on Carcinogens.					
URETHANE CATALYST	77-58-7	< 1.	.1 ppm		
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3					
SUBSTITUTED PROPENOIC ACID	6197-30-4	< 1.	5 mg/M3	5	

SECTION III - PHYSICAL DATA

Boiling Range: 231 - 484 Deg. F
Evap. Rate: 0.58 x n-Butyl Acetate
Volatiles volume: 63.3 %
Appearance: CLEAR LIQUID

Vapor Density: Heavier than Air.
Liquid Density: Lighter than Water.
Wgt per gallon: 7.99 Pounds.

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: RO-002

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: 79 F SETA LEL : 1. %

-EXTINGUISHING MEDIA:
FOAM, CO2, OR DRY CHEMICAL

-SPECIAL FIREFIGHTING PROCEDURES:
WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET
DO NOT ENTER FIRE AREA WITHOUT PROPER PROTECTION BECAUSE HAZARDOUS DECOMPOSITION PRODUCTS MAY BE PRESENT. (SEE VI)

-UNUSUAL FIRE & EXPLOSION HAZARDS:
WATER PRESSURE MAY SPREAD A FLAMMABLE LIQUID FIRE.
SEALED CONTAINERS MAY EXPLODE IF OVERHEATED.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:
IF PEL'S ARE KNOWN, THEY ARE LISTED IN SECT. II ·
W A R N I N G CARE MUST BE TAKEN NOT TO EXCEED THE EXPOSURE LIMIT FOR THE LOWEST TLV SHOWN IN SECTION II. WHEN IN DOUBT, WEAR AN APPROVED RESPIRATOR AND ORDER AIR SAMPLING TESTS.
BY ANALOGY TO OTHER SIMILAR MATERIALS, THIS PRODUCT HAS THE POTENTIAL FOR SIGNIFICANT SKIN ABSORBTION. THERE IS NO KNOWN DATA TO INDICATE POTENTIAL TOXICITY UNDER PROLONGED/REPEATED EXPOSURE.

-EFFECTS OF OVEREXPOSURE:
OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.
OVEREXPOSURE TO AROMATIC ISOCYANATES WILL CAUSE IRRITATION TO THE RESPIRATORY TRACT (DRY THROAT, COUGH, SHORTNESS OF BREATH, CHEST TIGHTNESS) RESULTING IN SINUSITIS, BRONCHITIS AND ASTHMA-LIKE SYMPTOMS.

-FIRST AID:
--EYE CONTACT-FLUSH WITH PLENTY OF CLEAN LUKEWARM LOW PRESSURE WATER FOR 15 MIN.. OCCASIONALY LIFTING EYELIDS OPEN.
GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION. KEEP VICTOM QUIET.
NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSION LIQUIDS.
IF THE VICTOM HAS INGESTED LARGE QUANTITIES, AND IS COMPLETELY CONSCIOUS/ALERT, THEN ADMINISTER LUKEWARM WATER (PINT).

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER.
DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION
(cont.)

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: RO-002

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)
PERSISTS, GET MEDICAL ATTENTION.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur
-INCOMPATABILITY:
MAY BE INCOMPATIBLE WITH OXIDIZING AGENTS AND STRONG ALKALIES.
-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE
HIGH TEMPERATURE, STRONG OXIDIZING CONDITIONS, EXTENDED
CONTACT WITH AIR/OXYGEN.
WARNING: Do not spray-apply this material.
-HAZARDOUS DECOMPOSITION PRODUCTS:
INCOMPLETE COMBUSTION FOR PRODUCTS LIKE THIS MAY GENERATE
HIGHLY POISONOUS CARBON MONOXIDE AND OTHER TOXIC GASES.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
WARNING - FLAMMABLE. ELIMINATE ALL IGNITION SOURCES.
HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING.
SOAK UP WITH AN ABSORBENT AND PLACE IN NON-LEAKING
CONTAINERS. SEAL TIGHTLY FOR PROPER DISPOSAL.
-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND
FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-MUST PROVIDE ADEQUATE VENTILATION TO MAINTAIN VAPOR
CONCENTRATIONS BELOW THE ESTABLISHED TLV LIMIT AS GIVEN BY OSHA.
IN MORE CONFINED AREAS A NIOSH-MSHA APPROVED RESPIRATOR EQUIPPED
WITH ORGANIC VAPOR CARTRIDGE SHOULD BE WORN.
BECAUSE THIS MATERIAL CONTAINS AROMATIC ISOCYANATES, THOSE
INDIVIDUALS HAVING A HISTORY OF RESPIRATORY ILLNESS OR
ASTHMATIC CONDITIONS SHOULD BE PRECLUDED FROM EXPOSURE.
WARNING:Do not spray-apply this material.
-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.
-PROTECTIVE GLOVES:
USE RUBBER GLOVES
-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD.
-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AVAILABLE

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

TREAT AS A HAZARDOUS-FLAMMABLE MATERIAL.
KNOW APPLICABLE D.O.T REGULATIONS BEFORE ATTEMPTING TO TRANSPORT THIS MATERIAL.
WARNING: Do not spray-apply this material.

-OTHER PRECAUTIONS:

N O T E

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MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: PRE-POLYMER CATALYST
Trade Name : JUREX CATALYST
Product Code : R0-086
C.A.S. Number: SEE BELOW

Hazard Ratings: Health - 3
none -> extreme Fire - 3
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV	Exposure Limits OSHA/PEL	VP mm HG
XYLENE	1330-20-7	5-20	100 ppm S.T.E.L.= 150	100	25.
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4					
PM ACETATE	108-65-6	20-50	Undetermined		3.8
THE MANUFACTURER OF THE ABOVE ITEM LISTS 'NONE' FOR TLV					
TOLUENE DIISOCYANATE	26477-62-5	< 1.	.01 ppm	.02	0.

THE ABOVE AROMATIC ISOCYANATE CONSISTS OF:
80% 2,4 TOLUENE DIISOCYANATE CAS NO 584-84-9
20% 2,6 TOLUENE DIISOCYANATE CAS NO 91-08-7
The indicated TLV is 0.005 ppm ACGIH, 1983
In a National Toxicology Program (NTP) study, this material was carcinogenic when given orally to rats and mice at maximum tolerated doses. THIS MATERIAL WAS NOT CARCINOGENIC TO RATS IN A TWO YEAR INHALATION STUDY. Based on the results of the ORAL study, this material was included in the NTP annual report on Carcinogens.

SECTION III - PHYSICAL DATA

Boiling Range: 280 - 484 Deg. F
Evap. Rate: 0.43 x n-Butyl Acetate
Volatiles volume: 45.2 %
Appearance: CLEAR LIQUID

Vapor Density: Heavier than Air.
Liquid Density: Heavier than Water.
Wgt per gallon: 9.06 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: 80 F SETA LEL : 1. %

-EXTINGUISHING MEDIA:
FOAM, CO2, OR DRY CHEMICAL
-SPECIAL FIREFIGHTING PROCEDURES:
WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET
DO NOT ENTER FIRE AREA WITHOUT PROPER PROTECTION BECAUSE HAZARDOUS DECOMPOSITION PRODUCTS MAY BE PRESENT. (SEE VI)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (cont.)

-UNUSUAL FIRE & EXPLOSION HAZARDS:

WATER PRESSURE MAY SPREAD A FLAMMABLE LIQUID FIRE.
SEALED CONTAINERS MAY EXPLODE IF OVERHEATED.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

IF PEL'S ARE KNOWN, THEY ARE LISTED IN SECT. II
W A R N I N G CARE MUST BE TAKEN NOT TO EXCEED THE EXPOSURE LIMIT FOR THE LOWEST TLV SHOWN IN SECTION II. WHEN IN DOUBT, WEAR AN APPROVED RESPIRATOR AND ORDER AIR SAMPLING TESTS.
BY ANALOGY TO OTHER SIMILAR MATERIALS, THIS PRODUCT HAS THE POTENTIAL FOR SIGNIFICANT SKIN ABSORBTION. THERE IS NO KNOWN DATA TO INDICATE POTENTIAL TOXICITY UNDER PROLONGED/REPEATED EXPOSURE.

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.
OVEREXPOSURE TO AROMATIC ISOCYANATES WILL CAUSE IRRITATION TO THE RESPIRATORY TRACT (DRY THROAT, COUGH, SHORTNESS OF BREATH, CHEST TIGHTNESS) RESULTING IN SINUSITIS, BRONCHITIS AND ASTHMA-LIKE SYMPTOMS.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF CLEAN LUKEWARM LOW PRESSURE WATER FOR 15 MIN., OCCASIONALY LIFTING EYELIDS OPEN.
GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION. KEEP VICTOM QUIET.
NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSION LIQUIDS.
IF THE VICTOM HAS INGESTED LARGE QUANTITIES, AND IS COMPLETELY CONSCIOUS/ALERT, THEN ADMINISTER LUKEWARM WATER (PINT).

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER.
DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION.

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: RO-086

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur

-INCOMPATABILITY:
MAY BE INCOMPATIBLE WITH OXIDIZING AGENTS AND STRONG ALKALIES.

-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE
HIGH TEMPERATURE, STRONG OXIDIZING CONDITIONS, EXTENDED
CONTACT WITH AIR/OXYGEN.
WARNING: Do not spray-apply this material.

-HAZARDOUS DECOMPOSITION PRODUCTS:
INCOMPLETE COMBUSTION FOR PRODUCTS LIKE THIS MAY GENERATE
HIGHLY POISONOUS CARBON MONOXIDE AND OTHER TOXIC GASES.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
WARNING - FLAMMABLE. ELIMINATE ALL IGNITION SOURCES.
HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING.
SOAK UP WITH AN ABSORBENT AND PLACE IN NON-LEAKING
CONTAINERS. SEAL TIGHTLY FOR PROPER DISPOSAL.

-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND
FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-MUST PROVIDE ADEQUATE VENTILATION TO MAINTAIN VAPOR
CONCENTRATIONS BELOW THE ESTABLISHED TLV LIMIT AS GIVEN BY OSHA.
IN MORE CONFINED AREAS A NIOSH-MSHA APPROVED RESPIRATOR EQUIPPED
WITH ORGANIC VAPOR CARTRIDGE SHOULD BE WORN.
BECAUSE THIS MATERIAL CONTAINS AROMATIC ISOCYANATES, THOSE
INDIVIDUALS HAVING A HISTORY OF RESPIRATORY ILLNESS OR
ASTHMATIC CONDITIONS SHOULD BE PRECLUDED FROM EXPOSURE.
WARNING:Do not spray-apply this material.

-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.

-PROTECTIVE GLOVES:
USE RUBBER GLOVES

-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD.

-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AVAILABLE

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
TREAT AS A HAZARDOUS-FLAMMABLE MATERIAL.
KNOW APPLICABLE D.O.T REGULATIONS BEFORE ATTEMPTING TO
TRANSPORT THIS MATERIAL.
WARNING: Do not spray-apply this material.

SECTION IX - SPECIAL PRECAUTIONS (cont.)

-OTHER PRECAUTIONS:

N O T E

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc. it is the user's obligation to determine the conditions of safe use of this product.

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MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: M.C. URETHANE
Trade Name : CLEAR M.C. URETHANE
Product Code : R0-025
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: none -> extreme
0 ---> 4
Health - 3
Fire - 3
Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV	Exposure Limits OSHA/PEL	VP mm HG
XYLENE	1330-20-7	50-75	100 ppm S.T.E.L.= 150	100	25.
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4					
PM ACETATE	108-65-6	1-5	Undetermined		3.8
THE MANUFACTURER OF THE ABOVE ITEM LISTS 'NONE' FOR TLV					
POLYPROPYLENE GLYCOL	25322-69-4	1-5	Undetermined		
PRODUCT IS A LOW HAZARD LIQUID.					
TOLUENE DIISOCYANATE	26477-62-5	< 1.	.01 ppm	.02	0.
THE ABOVE AROMATIC ISOCYANATE CONSISTS OF: 80% 2,4 TOLUENE DIISOCYANATE CAS NO 584-84-9; 20% 2,6 TOLUENE DIISOCYANATE CAS NO 91-08-7					
The indicated TLV is 0.005 ppm ACGIH, 1983					
In a National Toxicology Program (NTP) study, this material was carcinogenic when given orally to rats and mice at maximum tolerated doses. THIS MATERIAL WAS NOT CARCINOGENIC TO RATS IN A TWO YEAR INHALATION STUDY. Based on the results of the ORAL study, this material was included in the NTP annual report on Carcinogens.					
URETHANE CATALYST	77-58-7	< 1.	.1 ppm		
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3					
CYCLOHENANONE	108-94-1	< 1.	25 ppm	50	2.
THE ABOVE ITEM HAS A 50 PPM PEL (OSHA) AT 200 MG/M3 TWA					
THE ACGIH TLV (1985-1986) IS 25 PPM AT 100 MG/M3 TWA (SKIN)					

SECTION III - PHYSICAL DATA

Boiling Range: 157 - 552 Deg. F
Evap. Rate: 0.59 x n-Butyl Acetate
Volatiles volume: 68.6 %
Appearance: CLEAR THIN LIQUID

Vapor Density: Heavier than Air.
Liquid Density: Lighter than Water.
Wgt per gallon: 7.86 Pounds.

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: RO-025

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: 77 F SETA LEL : 1. %

-EXTINGUISHING MEDIA:
FOAM, CO2, OR DRY CHEMICAL

-SPECIAL FIREFIGHTING PROCEDURES:
WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET
DO NOT ENTER FIRE AREA WITHOUT PROPER PROTECTION BECAUSE HAZARDOUS DECOMPOSITION PRODUCTS MAY BE PRESENT. (SEE VI)

-UNUSUAL FIRE & EXPLOSION HAZARDS:
WATER PRESSURE MAY SPREAD A FLAMMABLE LIQUID FIRE.
SEALED CONTAINERS MAY EXPLODE IF OVERHEATED.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:
IF PEL'S ARE KNOWN, THEY ARE LISTED IN SECT. II
W A R N I N G CARE MUST BE TAKEN NOT TO EXCEED THE EXPOSURE LIMIT FOR THE LOWEST TLV SHOWN IN SECTION II. WHEN IN DOUBT, WEAR AN APPROVED RESPIRATOR AND ORDER AIR SAMPLING TESTS.
BY ANALOGY TO OTHER SIMILAR MATERIALS, THIS PRODUCT HAS THE POTENTIAL FOR SIGNIFICANT SKIN ABSORBTION. THERE IS NO KNOWN DATA TO INDICATE POTENTIAL TOXICITY UNDER PROLONGED/REPEATED EXPOSURE.

-EFFECTS OF OVEREXPOSURE:
OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.
OVEREXPOSURE TO AROMATIC ISOCYANATES WILL CAUSE IRRITATION TO THE RESPIRATORY TRACT (DRY THROAT, COUGH, SHORTNESS OF BREATH, CHEST TIGHTNESS) RESULTING IN SINUSITIS, BRONCHITIS AND ASTHMA-LIKE SYMPTOMS.

-FIRST AID:
--EYE CONTACT-FLUSH WITH PLENTY OF CLEAN LUKEWARM LOW PRESSURE WATER FOR 15 MIN., OCCASIONALY LIFTING EYELIDS OPEN.
GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION. KEEP VICTOM QUIET.
NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSION LIQUIDS.
IF THE VICTOM HAS INGESTED LARGE QUANTITIES, AND IS COMPLETELY CONSCIOUS/ALERT, THEN ADMINISTER LUKEWARM WATER (PINT).

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER.
DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION

(cont.)

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: RO-025

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)
PERSISTS, GET MEDICAL ATTENTION.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur
-INCOMPATABILITY:
MAY BE INCOMPATIBLE WITH OXIDIZING AGENTS AND STRONG ALKALIES.
-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE
HIGH TEMPERATURE, STRONG OXIDIZING CONDITIONS, EXTENDED
CONTACT WITH AIR/OXYGEN.
WARNING: Do not spray-apply this material.
-HAZARDOUS DECOMPOSITION PRODUCTS:
INCOMPLETE COMBUSTION FOR PRODUCTS LIKE THIS MAY GENERATE
HIGHLY POISONOUS CARBON MONOXIDE AND OTHER TOXIC GASES.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
WARNING - FLAMMABLE. ELIMINATE ALL IGNITION SOURCES.
HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING.
SOAK UP WITH AN ABSORBENT AND PLACE IN NON-LEAKING
CONTAINERS. SEAL TIGHTLY FOR PROPER DISPOSAL.
-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND
FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-MUST PROVIDE ADEQUATE VENTILATION TO MAINTAIN VAPOR
CONCENTRATIONS BELOW THE ESTABLISHED TLV LIMIT AS GIVEN BY OSHA.
IN MORE CONFINED AREAS A NIOSH-MSHA APPROVED RESPIRATOR EQUIPPED
WITH ORGANIC VAPOR CARTRIDGE SHOULD BE WORN.
BECAUSE THIS MATERIAL CONTAINS AROMATIC ISOCYANATES, THOSE
INDIVIDUALS HAVING A HISTORY OF RESPIRATORY ILLNESS OR
ASTHMATIC CONDITIONS SHOULD BE PRECLUDED FROM EXPOSURE.
WARNING:Do not spray-apply this material.
-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.
-PROTECTIVE GLOVES:
USE RUBBER GLOVES
-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD.
-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AVAILABLE

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

TREAT AS A HAZARDOUS-FLAMMABLE MATERIAL.
KNOW APPLICABLE D.O.T REGULATIONS BEFORE ATTEMPTING TO TRANSPORT THIS MATERIAL.
WARNING: Do not spray-apply this material.

-OTHER PRECAUTIONS:

N O T E

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc. it is the user's obligation to determine the conditions of safe use of this product.

Crawford Laboratories Inc. makes no warranty, expressed or implied, as to the accuracy of the information and opinions, and assumes no responsibility for any damage to person, property or business arising from such use.

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MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: URETHANE 40
Trade Name : FLOROCK M.C.U.
Product Code : RO-065
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: none -> extreme
0 ---> 4
Health - 3
Fire - 3
Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV	Exposure Limits OSHA/PEL	VP mm HG
XYLENE	1330-20-7	50-75	100 ppm S.T.E.L.= 150	100	25.
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4					
PM ACETATE	108-65-6	1-5	Undetermined		3.8
THE MANUFACTURER OF THE ABOVE ITEM LISTS 'NONE' FOR TLV					
POLYPROPYLENE GLYCOL	25322-69-4	1-5	Undetermined		
PRODUCT IS A LOW HAZARD LIQUID.					
TOLUENE DIISOCYANATE	26477-62-5	< 1.	.01 ppm	.02	0.
THE ABOVE AROMATIC ISOCYANATE CONSISTS OF: 80% 2,4 TOLUENE DIISOCYANATE CAS NO 584-84-9; 20% 2,6 TOLUENE DIISOCYANATE CAS NO 91-08-7. The indicated TLV is 0.005 ppm ACGIH, 1983. In a National Toxicology Program (NTP) study, this material was carcinogenic when given orally to rats and mice at maximum tolerated doses. THIS MATERIAL WAS NOT CARCINOGENIC TO RATS IN A TWO YEAR INHALATION STUDY. Based on the results of the ORAL study, this material was included in the NTP annual report on Carcinogens.					
URETHANE CATALYST	77-58-7	< 1.	.1 ppm		
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3					
CYCLOHENANONE	108-94-1	< 1.	25 ppm	50	2.
THE ABOVE ITEM HAS A 50 PPM PEL (OSHA) AT 200 MG/M3 TWA THE ACGIH TLV (1985-1986) IS 25 PPM AT 100 MG/M3 TWA (SKIN)					

SECTION III - PHYSICAL DATA

Boiling Range: 157 - 552 Deg. F
Evap. Rate: 0.59 x n-Butyl Acetate
Volatiles volume: 64.4 %
Appearance: CLEAR LIQUID

Vapor Density: Heavier than Air.
Liquid Density: Lighter than Water.
Wgt per gallon: 7.94 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: 77F SETA LEL : 1. %

-EXTINGUISHING MEDIA:

FOAM, CO2, OR DRY CHEMICAL

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET

DO NOT ENTER FIRE AREA WITHOUT PROPER PROTECTION BECAUSE HAZARDOUS DECOMPOSITION PRODUCTS MAY BE PRESENT. (SEE VI)

-UNUSUAL FIRE & EXPLOSION HAZARDS:

WATER PRESSURE MAY SPREAD A FLAMMABLE LIQUID FIRE.

SEALED CONTAINERS MAY EXPLODE IF OVERHEATED.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

IF PEL'S ARE KNOWN, THEY ARE LISTED IN SECT. II

W A R N I N G CARE MUST BE TAKEN NOT TO EXCEED THE EXPOSURE LIMIT FOR THE LOWEST TLV SHOWN IN SECTION II. WHEN IN DOUBT, WEAR AN APPROVED RESPIRATOR AND ORDER AIR SAMPLING TESTS.

BY ANALOGY TO OTHER SIMILAR MATERIALS, THIS PRODUCT HAS THE POTENTIAL FOR SIGNIFICANT SKIN ABSORBTION. THERE IS NO KNOWN DATA TO INDICATE POTENTIAL TOXICITY UNDER PROLONGED/REPEATED EXPOSURE.

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.

OVEREXPOSURE TO AROMATIC ISOCYANATES WILL CAUSE IRRITATION TO THE RESPIRATORY TRACT (DRY THROAT, COUGH, SHORTNESS OF BREATH, CHEST TIGHTNESS) RESULTING IN SINUSITIS, BRONCHITIS AND ASTHMA-LIKE SYMPTOMS.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF CLEAN LUKEWARM LOW PRESSURE WATER FOR 15 MIN., OCCASIONALY LIFTING EYELIDS OPEN.
GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION. KEEP VICTOM QUIET.
NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSION LIQUIDS.
IF THE VICTOM HAS INGESTED LARGE QUANTITIES, AND IS COMPLETELY CONSCIOUS/ALERT, THEN ADMINISTER LUKEWARM WATER (PINT).

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER.
DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION

(cont.)

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)
PERSISTS, GET MEDICAL ATTENTION.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur
-INCOMPATABILITY:
MAY BE INCOMPATIBLE WITH OXIDIZING AGENTS AND STRONG ALKALIES.
-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE
HIGH TEMPERATURE, STRONG OXIDIZING CONDITIONS, EXTENDED
CONTACT WITH AIR/OXYGEN.
WARNING: Do not spray-apply this material.
-HAZARDOUS DECOMPOSITION PRODUCTS:
INCOMPLETE COMBUSTION FOR PRODUCTS LIKE THIS MAY GENERATE
HIGHLY POISONOUS CARBON MONOXIDE AND OTHER TOXIC GASES.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
WARNING - FLAMMABLE. ELIMINATE ALL IGNITION SOURCES.
HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING.
SOAK UP WITH AN ABSORBENT AND PLACE IN NON-LEAKING
CONTAINERS. SEAL TIGHTLY FOR PROPER DISPOSAL.
-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND
FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-MUST PROVIDE ADEQUATE VENTILATION TO MAINTAIN VAPOR
CONCENTRATIONS BELOW THE ESTABLISHED TLV LIMIT AS GIVEN BY OSHA.
IN MORE CONFINED AREAS A NIOSH-MSHA APPROVED RESPIRATOR EQUIPPED
WITH ORGANIC VAPOR CARTRIDGE SHOULD BE WORN.
BECAUSE THIS MATERIAL CONTAINS AROMATIC ISOCYANATES, THOSE
INDIVIDUALS HAVING A HISTORY OF RESPIRATORY ILLNESS OR
ASTHMATIC CONDITIONS SHOULD BE PRECLUDED FROM EXPOSURE.
WARNING:Do not spray-apply this material.
-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.
-PROTECTIVE GLOVES:
USE RUBBER GLOVES
-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD.
-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AVAILABLE

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

TREAT AS A HAZARDOUS-FLAMMABLE MATERIAL.
KNOW APPLICABLE D.O.T REGULATIONS BEFORE ATTEMPTING TO TRANSPORT THIS MATERIAL.
WARNING: Do not spray-apply this material.

-OTHER PRECAUTIONS:

N O T E

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc. it is the user's obligation to determine the conditions of safe use of this product.

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MATERIAL SAFETY DATA SHEET

For Coatings, Resins and Related Materials

07/10/89

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: OIL MODIFIED URETHANE
Trade Name : ALKATHANE #1
Product Code : RO-017
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: Health - 3
none -> extreme Fire - 2
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV		OSHA/PEL		VP mm HG
MINERAL SPIRITS/66	8032-32-4	50-75	100	ppm	500		3.4
URETHANE CATALYST	77-58-7	< 1.	.1	ppm			
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3							
NORMAL BUTYL ALCOHOL	71-36-3	1-5	50	ppm	100		4.8

SECTION III - PHYSICAL DATA

Boiling Range: 243 - 484 Deg. F
Evap. Rate: 0.08 x n-Butyl Acetate
Volatiles volume: 61.5 %
Appearance: PALE YELLOW CLEAR

Vapor Density: Heavier than Air.
Liquid Density: Lighter than Water.
Wgt per gallon: 7.41 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: 102F SETA LEL : 0.9 %

-EXTINGUISHING MEDIA:

FOAM, CO2, OR DRY CHEMICAL

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET. DO NOT ENTER FIRE AREA WITHOUT PROPER PROTECTION BECAUSE HAZARDOUS DECOMPOSITION PRODUCTS MAY BE PRESENT (SEE VI).

-UNUSUAL FIRE & EXPLOSION HAZARDS:

WATER PRESSURE MAY SPREAD A COMBUSTIBLE LIQUID FIRE.
SEALED CONTAINERS MAY EXPLODE IF OVERHEATED.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

IF PEL'S ARE KNOWN, THEY ARE LISTED IN SECTION II
W A R N I N G : CARE MUST BE TAKEN TO ASSURE THAT THE LOWEST OF THE EXPOSURE LIMITS SET FOURTH IN SECTION II IS NOT EXCEEDED. WHEN IN DOUBT - WEAR AN APPROVED RESPIRATOR, AND ORDER AIR SAMPLING TESTS.

SECTION V - HEALTH HAZARD DATA (cont.)

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION, DERMATITIS AND 6-SENSITIZATION AFTER REPEATED CONTACT.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF FRESH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

-INGESTION- DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur

-INCOMPATABILITY:

MAY BE INCOMPATIBLE WITH STRONG OXIDIZING AGENTS AND STRONG ALKALIES.

-CONDITIONS TO AVOID:

AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE. ALSO, AIRCRAFT TRANSPORT MUST BE IN STRICT ACCORDANCE WITH APPLICABLE REGULATIONS

-HAZARDOUS DECOMPOSITION PRODUCTS:

INCOMPLETE COMBUSTION FOR PRODUCTS LIKE THIS MAY FORM HIGHLY POISONOUS CARBON MONOXIDE AND OTHER TOXIC GASES.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WARNING - COMBUSTIBLE. ELIMINATE ALL IGNITION SOURCES. HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING. WEARING THE PROTECTIVE CLOTHING OUTLINED IN SECTION VIII, SOAK UP WITH AN ABSORBANT AND PLACE IN NON-LEAKING CONTAINERS. SEAL TIGHTLY FOR PROPER DISPOSAL.

SECTION VII - SPILL OR LEAK PROCEDURES (cont.)

-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
USE NIOSH APPROVED ORGANIC VAPOR RESPIRATORS WHERE VENTILATION IS INADEQUATE.

-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.

-PROTECTIVE GLOVES:
USE RUBBER GLOVES

-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES

-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AVAILABLE

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
TREAT AS ANY HAZARDOUS-COMBUSTIBLE MATERIAL; STORE IN A COOL, DRY PLACE IN BUILDINGS DESIGNED FOR THE STORAGE OF COMBUSTIBLE LIQUIDS.

-OTHER PRECAUTIONS:

NOTE

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc., it is the user's obligation to determine the conditions of safe use of this product.

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MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: OIL MODIFIED URETHANE
Trade Name : ALKATHANE 2
Product Code : RO-031
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: Health - 3
none -> extreme Fire - 2
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV		Exposure Limits OSHA/PEL		VP mm HG
MINERAL SPIRITS/66	8032-32-4	50-75	100	ppm	500		3.4
URETHANE CATALYST	77-58-7	< 1.	.1	ppm			
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3							
NORMAL BUTYL ALCOHOL	71-36-3	1-5	50	ppm	100		4.8

SECTION III - PHYSICAL DATA

Boiling Range: 243 - 484 Deg. F
Evap. Rate: 0.08 x n-Butyl Acetate
Volatiles volume: 66.7 %
Appearance: PALE YELLOW, SLIGHT OILY ODOR

Vapor Density: Heavier than Air.
Liquid Density: Lighter than Water.
Wgt per gallon: 7.29 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: 102F SETA LEL : 0.9 %

-EXTINGUISHING MEDIA:

FOAM, CO2, OR DRY CHEMICAL

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET. DO NOT ENTER FIRE AREA WITHOUT PROPER PROTECTION BECAUSE HAZARDOUS DECOMPOSITION PRODUCTS MAY BE PRESENT (SEE VI).

-UNUSUAL FIRE & EXPLOSION HAZARDS:

WATER PRESSURE MAY SPREAD A COMBUSTIBLE LIQUID FIRE.
SEALED CONTAINERS MAY EXPLODE IF OVERHEATED.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

IF PEL'S ARE KNOWN, THEY ARE LISTED IN SECTION II
W A R N I N G : CARE MUST BE TAKEN TO ASSURE THAT THE LOWEST OF THE EXPOSURE LIMITS SET FOURTH IN SECTION II IS NOT EXCEEDED. WHEN IN DOUBT - WEAR AN APPROVED RESPIRATOR, AND ORDER AIR SAMPLING TESTS.

SECTION V - HEALTH HAZARD DATA (cont.)

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION, DERMATITIS AND 6-SENSITIZATION AFTER REPEATED CONTACT.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF FRESH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

-INGESTION- DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.
NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur

-INCOMPATABILITY:

MAY BE INCOMPATIBLE WITH STRONG OXIDIZING AGENTS AND STRONG ALKALIES.

-CONDITIONS TO AVOID:

AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE. ALSO, AIRCRAFT TRANSPORT MUST BE IN STRICT ACCORDANCE WITH APPLICABLE REGULATIONS

-HAZARDOUS DECOMPOSITION PRODUCTS:

INCOMPLETE COMBUSTION FOR PRODUCTS LIKE THIS MAY FORM HIGHLY POISONOUS CARBON MONOXIDE AND OTHER TOXIC GASES.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WARNING - COMBUSTIBLE. ELIMINATE ALL IGNITION SOURCES. HANDLING EQUIPMENT MUST BE GROUNDED TO PREVENT SPARKING. WEARING THE PROTECTIVE CLOTHING OUTLINED IN SECTION VIII, SOAK UP WITH AN ABSORBANT AND PLACE IN NON-LEAKING CONTAINERS. SEAL TIGHTLY FOR PROPER DISPOSAL.

SECTION VII - SPILL OR LEAK PROCEDURES (cont.)

-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
USE NIOSH APPROVED ORGANIC VAPOR RESPIRATORS WHERE VENTILATION IS INADEQUATE.
-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.
-PROTECTIVE GLOVES:
USE RUBBER GLOVES
-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES
-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AVAILABLE

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
TREAT AS ANY HAZARDOUS-COMBUSTIBLE MATERIAL; STORE IN A COOL, DRY PLACE IN BUILDINGS DESIGNED FOR THE STORAGE OF COMBUSTIBLE LIQUIDS.
-OTHER PRECAUTIONS:

NOTE

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc., it is the user's obligation to determine the conditions of safe use of this product.

Crawford Laboratories, Inc., makes no warranty, expressed or implied, as to the accuracy of the information and opinions, and assumes no responsibility for any damage to person, property or business arising from such use.

text02

MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: PRIMER
Trade Name : RED OXIDE PRIMER
Product Code : R2-019
C.A.S. Number: NONE

Hazard Ratings: Health - 3
none -> extreme Fire - 1
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV		Exposure Limits OSHA/PEL		VP mm HG
1-1-1 TRICHOLORETHANE	000071-55-6	50-75	350	ppm	350		
DIETHYLENE ETHER	000123-91-1	1-5	25	ppm	100		
1,2 BUTYLENE OXIDE	000106-88-7	< 1.	40	ppm			
DOW INDUSTRIAL HYGIENE GUIDE FOR THIS PRODUCT IS 40 PPM.							
NITROMETHANE	000075-52-5	< 1.	100	ppm			
CRYSTALLINE SILICA	14464-46-1	< 1.	0.1	mg/M3			
The International Agency for Research on Cancer (IARC) has determined that there is limited evidence of the carcinogenicity of crystalline silica to humans.							
XYLENE	1330-20-7	< 1.	100	ppm	100		25.
		S.T.E.L.=	150				
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4							
ISOPROPANOL	67-63-0	< 1.	400	ppm	400		33.
URETHANE CATALYST	77-58-7	< 1.	.1	ppm			
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3							
NORMAL BUTYL ALCOHOL	71-36-3	< 1.	50	ppm	100		4.8
MANGANESE	7439-96-5	< 1.	5	mg/M3	5		
MINERAL SPIRITS/66	8032-32-4	< 1.	100	ppm	500		3.4
ACETIC ACID	64-19-7	< 1.	10	ppm	10		
		S.T.E.L.=	15				

SECTION III - PHYSICAL DATA

Boiling Range: 165 - 484 Deg. F
Evap. Rate: 0.02 x n-Butyl Acetate
Volatiles volume: 74.8 %
Appearance: RED PRIMER

Vapor Density: Heavier than Air.
Liquid Density: Heavier than Water.
Wgt per gallon: 11.87 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: >200 LEL : 0.9 %

-EXTINGUISHING MEDIA:

CO2, DRY CHEMICAL, OR ALCOHOL TYPE FOAM.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (cont.)

-SPECIAL FIREFIGHTING PROCEDURES:
WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET
WEAR APPROVED SELF-CONTAINED BREATHING APPARATUS FOR PROTECTION FROM TOXIC VAPORS OR INADEQUATE OXYGEN SUPPLY.

-UNUSUAL FIRE & EXPLOSION HAZARDS:
CHLORONATED SOLVENTS INVOLVED IN FIRES MAY DECOMPOSE TO HYDROGEN CHLORIDE AND POSSIBLE TRACED OF PHOSGENE.
THE VAPORS CAN BE TOXIC AND ARE CORROSIVE.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:
NONE ESTABLISHED - SEE SECTION II
CARE MUST BE TAKEN NOT TO EXCEED THE LOWEST TLV FROM SECTION 2.
WHEN IN DOUBT - WEAR AN APPROVED RESPIRATOR.

-EFFECTS OF OVEREXPOSURE:
OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.

-FIRST AID:
--EYE CONTACT-FLUSH WITH PLENTY OF FRESH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION IMMEDIATELY. KEEP VICTIM QUIET NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION. IF LARGE QUANTITIES ARE SWALLOWED, ADMINISTER LUKEWARM WATER (PINT) IF VICTIM IS COMPLETELY CONSCIOUS/ALERT. NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS. DO NOT INDUCE VOMITING.

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION. IF STICKY - USE WATERLESS CLEANER FIRST.

NOTE TO PHYSICIAN: BECAUSE OF RAPID ABSORPTION MAY OCCUR THROUGH LUNGS IF ASPIRATED AND CAUSE SYSTMIC EFFECTS, THE DECISION OF WHETHER TO INDUCE VOMITING OR NOT SHOULD BE MADE BY AN ATTENDING PHYSICIAN. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGEAL CONTROL. DANGER FROM LUNG ASPIRATION MUST BE WEIGHED AGAINST TOXICITY WHEN CONSIDERING EMPTYING THE STOMACH. EXPOSURE MAY INCREASE MYOCARDIAL IRRITABILITY. DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS UNLESS ABSOLUTELY NECESSARY.
(cont.)

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur

-INCOMPATABILITY:
AVOID CONTACT WITH PURE OXYGEN, ALKALI METALS, OPEN FLAMES, AND ELECTRICAL ARCS.

-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE ALSO, AIRCRAFT TRANSPORT MUST BE IN STRICT ACCORDANCE WITH APPLICABLE REGULATIONS

-HAZARDOUS DECOMPOSITION PRODUCTS:
AT HIGH TEMPERATURES, DECOMPOSITION MAY CAUSE THE RELEASE OF HYDROGEN CHLORIDE VAPOR AND SMALL QUANTITIES OF OTHER TOXIC AND IRRITATING VAPORS SUCH AS PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
NON-COMBUSTIBLE: WEAR PROTECTION EQUIPMENT INDICATED IN SECTION VIII DURING CLEAN UP. SOAK UP WITH AN ABSORBANT AND PLACE IN A NON-LEAKING CONTAINER. SEAL TIGHTLY FOR PROPER DISPOSAL. FLUSH AREA WITH WATER.

-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-WEAR A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE IN OPEN, WELL VENTILATED AREAS. IN CONFINED AREAS, USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.

-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.

-PROTECTIVE GLOVES:
USE IMPERVIOUS RUBBER GLOVES

-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD

-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AND SAFETY SHOWER AVAILABLE.

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
AVOID BREATHING VAPORS. STORE IN A COOL DRY PLACE.
TIGHTLY CLOSE CONTAINERS. KEEP AWAY FROM SPARKS,
OPEN FLAME OR STRONG OXIDIZING AGENTS.

-OTHER PRECAUTIONS:
VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS. DO NOT ENTER THESE AREAS WHERE VAPORS OF THIS PRODUCT ARE SUSPECTED UNLESS SPECIAL BREATHING APPARATUS IS USED.

NOTE

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc., it is the user's obligation to determine the conditions of safe use of this product.

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text03

MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: FLAMEOUT
Trade Name : DARK BLUE FLAMEOUT
Product Code : R5-018
C.A.S. Number:

Hazard Ratings: Health - 3
none -> extreme Fire - 1
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV		OSHA/PEL		VP mm HG
1-1-1 TRICHOLORETHANE	000071-55-6	50-75	350	ppm	350		
DIETHYLENE ETHER	000123-91-1	1-5	25	ppm	100		
1,2 BUTYLENE OXIDE	000106-88-7	< 1.	40	ppm			
DOW INDUSTRIAL HYGIENE GUIDE FOR THIS PRODUCT IS 40 PPM.							
NITROMETHANE	000075-52-5	< 1.	100	ppm			
ISOPROPANOL	67-63-0	< 1.	400	ppm	400		33.
CRYSTALLINE SILICA	14464-46-1	< 1.	0.1	mg/M3			
The International Agency for Research on Cancer (IARC) has determined that there is limited evidence of the carcinogenicity of crystalline silica to humans.							
C.I. PIGMENT RED57:1	NONE AVAILABLE	< 1.	Undetermined				
DO NOT INGEST. CONTAINS CALCIUM RESINATE.							
URETHANE CATALYST	77-58-7	< 1.	.1	ppm			
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3							
NORMAL BUTYL ALCOHOL	71-36-3	< 1.	50	ppm	100		4.8
XYLENE	1330-20-7	< 1.	100	ppm	100		25.
		S.T.E.L.=	150				
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4							
MANGANESE	7439-96-5	< 1.	5	mg/M3	5		
MINERAL SPIRITS/66	8032-32-4	< 1.	100	ppm	500		3.4
ACETIC ACID	64-19-7	< 1.	10	ppm	10		
		S.T.E.L.=	15				

SECTION III - PHYSICAL DATA

Boiling Range: 165 - 484 Deg. F
Evap. Rate: 0.01 x n-Butyl Acetate
Volatiles volume: 74.7 %
Appearance: DARK BLUE LIQUID

Vapor Density: Heavier than Air.
Liquid Density: Heavier than Water.
Wgt per gallon: 11.07 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: >200F SETA LEL : 0.9 %

-EXTINGUISHING MEDIA:

CO2, DRY CHEMICAL, OR ALCOHOL TYPE FOAM.

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET
WEAR APPROVED SELF-CONTAINED BREATHING APPARATUS FOR PROTECTION FROM TOXIC VAPORS OR INADEQUATE OXYGEN SUPPLY.

-UNUSUAL FIRE & EXPLOSION HAZARDS:

CHLORONATED SOLVENTS INVOLVED IN FIRES MAY DECOMPOSE TO HYDROGEN CHLORIDE AND POSSIBLE TRACED OF PHOSGENE.
THE VAPORS CAN BE TOXIC AND ARE CORROSIVE.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

NONE ESTABLISHED - SEE SECTION II
CARE MUST BE TAKEN NOT TO EXCEED THE LOWEST TLV FROM SECTION 2.
WHEN IN DOUBT - WEAR AN APPROVED RESPIRATOR.

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF FRESH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION IMMEDIATELY. KEEP VICTIM QUIET NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION. IF LARGE QUANTITIES ARE SWALLOWED, ADMINISTER LUKEWARM WATER (PINT) IF VICTIM IS COMPLETELY CONSCIOUS/ALERT. NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS. DO NOT INDUCE VOMITING.

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION. IF STICKY - USE WATERLESS CLEANER FIRST.

NOTE TO PHYSICIAN: BECAUSE OF RAPID ABSORPTION MAY OCCUR THROUGH LUNGS IF ASPIRATED AND CAUSE SYSTMIC EFFECTS, THE DECISION OF WHETHER TO INDUCE VOMITING OR NOT SHOULD BE MADE BY AN ATTENDING PHYSICIAN. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGEAL CONTROL. DANGER FROM LUNG ASPIRATION MUST BE WEIGHED AGAINST TOXICITY WHEN

(cont.)

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)
CONSIDERING EMPTYING THE STOMACH. EXPOSURE MAY INCREASE MYOCARDIAL IRRITABILITY. DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS UNLESS ABSOLUTELY NECESSARY.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur
-INCOMPATABILITY:
AVOID CONTACT WITH PURE OXYGEN, ALKALI METALS, OPEN FLAMES, AND ELECTRICAL ARCS.
-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE ALSO, AIRCRAFT TRANSPORT MUST BE IN STRICT ACCORDANCE WITH APPLICABLE REGULATIONS
-HAZARDOUS DECOMPOSITION PRODUCTS:
AT HIGH TEMPERATURES, DECOMPOSITION MAY CAUSE THE RELEASE OF HYDROGEN CHLORIDE VAPOR AND SMALL QUANTITIES OF OTHER TOXIC AND IRRITATING VAPORS SUCH AS PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
NON-COMBUSTIBLE: WEAR PROTECTION EQUIPMENT INDICATED IN SECTION VIII DURING CLEAN UP. SOAK UP WITH AN ABSORBANT AND PLACE IN A NON-LEAKING CONTAINER. SEAL TIGHTLY FOR PROPER DISPOSAL. FLUSH AREA WITH WATER.
-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-WEAR A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE IN OPEN, WELL VENTILATED AREAS. IN CONFINED AREAS, USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.
-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.
-PROTECTIVE GLOVES:
USE IMPERVIOUS RUBBER GLOVES
-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD
-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AND SAFETY SHOWER AVAILABLE.

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

AVOID BREATHING VAPORS. STORE IN A COOL DRY PLACE. TIGHTLY CLOSE CONTAINERS. KEEP AWAY FROM SPARKS, OPEN FLAME OR STRONG OXIDIZING AGENTS.

-OTHER PRECAUTIONS:

VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS. DO NOT ENTER THESE AREAS WHERE VAPORS OF THIS PRODUCT ARE SUSPECTED UNLESS SPECIAL BREATHING APPARATUS IS USED.

NOTE

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc., it is the user's obligation to determine the conditions of safe use of this product.

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text03

MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: URETHANE
Trade Name : RED FLAMEOUT
Product Code : R6-010
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: Health - 3
none -> extreme Fire - 1
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV		OSHA/PEL	VP mm HG
1-1-1 TRICHOLORETHANE	000071-55-6	50-75	350	ppm	350	
DIETHYLENE ETHER	000123-91-1	1-5	25	ppm	100	
1,2 BUTYLENE OXIDE	000106-88-7	< 1.	40	ppm		
DOW INDUSTRIAL HYGIENE GUIDE FOR THIS PRODUCT IS 40 PPM.						
NITROMETHANE	000075-52-5	< 1.	100	ppm		
CRYSTALLINE SILICA	14464-46-1	< 1.	0.1	mg/M3		
The International Agency for Research on Cancer (IARC) has determined that there is limited evidence of the carcinogenicity of crystalline silica to humans.						
XYLENE	1330-20-7	< 1.	100	ppm	100	25.
		S.T.E.L.=	150			
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4						
ISOPROPANOL	67-63-0	< 1.	400	ppm	400	33.
URETHANE CATALYST	77-58-7	< 1.	.1	ppm		
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3						
NORMAL BUTYL ALCOHOL	71-36-3	< 1.	50	ppm	100	4.8
MANGANESE	7439-96-5	< 1.	5	mg/M3	5	
MINERAL SPIRITS/66	8032-32-4	< 1.	100	ppm	500	3.4
ACETIC ACID	64-19-7	< 1.	10	ppm	10	
		S.T.E.L.=	15			

SECTION III - PHYSICAL DATA

Boiling Range: 165 - 484 Deg. F
Evap. Rate: 0.02 x n-Butyl Acetate
Volatiles volume: 78.2 %
Appearance: RED LIQUID

Vapor Density: Heavier than Air.
Liquid Density: Heavier than Water.
Wgt per gallon: 11.02 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: >200 F LEL : 0.9 %

-EXTINGUISHING MEDIA:

CO2, DRY CHEMICAL, OR ALCOHOL TYPE FOAM.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (cont.)

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET
WEAR APPROVED SELF-CONTAINED BREATHING APPARATUS FOR PROTECTION FROM TOXIC VAPORS OR INADEQUATE OXYGEN SUPPLY.

-UNUSUAL FIRE & EXPLOSION HAZARDS:

CHLORONATED SOLVENTS INVOLVED IN FIRES MAY DECOMPOSE TO HYDROGEN CHLORIDE AND POSSIBLE TRACED OF PHOSGENE.
THE VAPORS CAN BE TOXIC AND ARE CORROSIVE.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

NONE ESTABLISHED - SEE SECTION II
CARE MUST BE TAKEN NOT TO EXCEED THE LOWEST TLV FROM SECTION 2.
WHEN IN DOUBT - WEAR AN APPROVED RESPIRATOR.

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF FRESH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION IMMEDIATELY. KEEP VICTIM QUIET NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION. IF LARGE QUANTITIES ARE SWALLOWED, ADMINISTER LUKEWARM WATER (PINT) IF VICTIM IS COMPLETELY CONSCIOUS/ALERT. NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS. DO NOT INDUCE VOMITING.

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION.
IF STICKY - USE WATERLESS CLEANER FIRST.

NOTE TO PHYSICIAN: BECAUSE OF RAPID ABSORPTION MAY OCCUR THROUGH LUNGS IF ASPIRATED AND CAUSE SYSTMIC EFFECTS, THE DECISION OF WHETHER TO INDUCE VOMITING OR NOT SHOULD BE MADE BY AN ATTENDING PHYSICIAN. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGEAL CONTROL. DANGER FROM LUNG ASPIRATION MUST BE WEIGHED AGAINST TOXICITY WHEN CONSIDERING EMPTYING THE STOMACH. EXPOSURE MAY INCREASE MYOCARDIAL IRRITABILITY. DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS UNLESS ABSOLUTELY NECESSARY.

(cont.)

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur

-INCOMPATABILITY:
AVOID CONTACT WITH PURE OXYGEN, ALKALI METALS, OPEN FLAMES, AND ELECTRICAL ARCS.

-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE ALSO, AIRCRAFT TRANSPORT MUST BE IN STRICT ACCORDANCE WITH APPLICABLE REGULATIONS

-HAZARDOUS DECOMPOSITION PRODUCTS:
AT HIGH TEMPERATURES, DECOMPOSITION MAY CAUSE THE RELEASE OF HYDROGEN CHLORIDE VAPOR AND SMALL QUANTITIES OF OTHER TOXIC AND IRRITATING VAPORS SUCH AS PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
NON-COMBUSTIBLE: WEAR PROTECTION EQUIPMENT INDICATED IN SECTION VIII DURING CLEAN UP. SOAK UP WITH AN ABSORBANT AND PLACE IN A NON-LEAKING CONTAINER. SEAL TIGHTLY FOR PROPER DISPOSAL. FLUSH AREA WITH WATER.

-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-WEAR A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE IN OPEN, WELL VENTILATED AREAS. IN CONFINED AREAS, USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.

-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.

-PROTECTIVE GLOVES:
USE IMPERVIOUS RUBBER GLOVES

-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD

-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AND SAFETY SHOWER AVAILABLE.

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: R6-010

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

AVOID BREATHING VAPORS. STORE IN A COOL DRY PLACE. TIGHTLY CLOSE CONTAINERS. KEEP AWAY FROM SPARKS, OPEN FLAME OR STRONG OXIDIZING AGENTS.

-OTHER PRECAUTIONS:

VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS. DO NOT ENTER THESE AREAS WHERE VAPORS OF THIS PRODUCT ARE SUSPECTED UNLESS SPECIAL BREATHING APPARATUS IS USED.

NOTE

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc., it is the user's obligation to determine the conditions of safe use of this product.

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text03

MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: URETHANE
Trade Name : RED FLAMEOUT
Product Code : R6-020
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: Health - 3
none -> extreme Fire - 1
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV		Exposure Limits OSHA/PEL		VP mm HG
1-1-1 TRICHOLORETHANE	000071-55-6	20-50	350	ppm	350		
DIETHYLENE ETHER	000123-91-1	1-5	25	ppm	100		
1,2 BUTYLENE OXIDE	000106-88-7	< 1.	40	ppm			
DOW INDUSTRIAL HYGIENE GUIDE FOR THIS PRODUCT IS 40 PPM.							
NITROMETHANE	000075-52-5	< 1.	100	ppm			
ISOPROPANOL	67-63-0	< 1.	400	ppm	400		33.
CRYSTALLINE SILICA	14464-46-1	< 1.	0.1	mg/M3			
The International Agency for Research on Cancer (IARC) has determined that there is limited evidence of the carcinogenicity of crystalline silica to humans.							
XYLENE	1330-20-7	< 1.	100	ppm	100		25.
		S.T.E.L.=	150				
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4							
LEAD	7439-92-1	1-5	.15	mg/M3	.05		
CHROMATE (AS CR+6)	1333-82-0	< 1.	.05	mg/M3	.1		
CARCINOGENICITY: Lead chromate is suspected to cause lung cancer and is listed by the National Toxicology Program (NTP) and the Internal Agency for research on cancer (IARC) NOTE - THE ABOVE WARNING IS PROVIDED BY THE MANUFACTURER OF THE PIGMENT, WHICH IS SUPPLIED IN THE POWDER FORM. ONCE DISPERSED IN PAINT, THE DUST HAZARD IS DIMINISHED.							
ANITIMONY (+3) OXIDE	1309-64-4	< 1.	.5	mg/M3	.5		
PIGMENT RED 48	5280-66-0	5-20	0	ppm			
Product contains a propriatary amount of manganese (CAS# 7439-96-5).							
URETHANE CATALYST	77-58-7	< 1.	.1	ppm			
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3							
NORMAL BUTYL ALCOHOL	71-36-3	< 1.	50	ppm	100		4.8
ISOBUTYL METHACRYLATE	97-86-9	< 1.	50	ppm			
TOLUENE	108-88-3	< 1.	100	ppm	100		38.
THE ABOVE ITEM CONTAINS A TRACE OF BENZENE							
COBALT COMPUNDS	NONE AVAILABLE	< 1.					
MINERAL SPIRITS/66	8032-32-4	< 1.	100	ppm	500		3.4
GLYCOL ETHER EE	110-80-5	< 1.	5	ppm	5		5.5
MANGANESE	7439-96-5	< 1.	5	mg/M3	5		
ACETIC ACID	64-19-7	< 1.	10	ppm	10		
		S.T.E.L.=	15				
METHYLENE CHLORIDE	75-09-2	5-20	100	ppm	500		340
NOTE - THE ACGIH 100 PPM IS FOR 8 HOUR TWA (cont.)							

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: R6-020

SECTION II - HAZARDOUS INGREDIENTS (cont.)

-OTHER PRECAUTIONS: (cont.)

FOR ANY 15 MINUTE EXCURSION, THE STEL IS 500 PPM

THE OSHA PEL IS -

500 PPM - 8 HOUR TWA

1000 PPM - ACCEPTABLE CEILING CONCENTRATION

2000 PPM - ACCEPTABLE PEAK ABOVE CEILING CONCENTRATION FOR 8 HOUR SHIFT. THE MAXIMUM DURATION FOR THIS EXPOSURE IS 5 MINUTES IN ANY 15 MINUTE EXCURSION.

CANCER INFORMATION - THE ABOVE MATERIAL HAS CAUSED CANCER IN CERTAIN LABORATORY ANIMALS, OF QUESTIONABLE RELEVANCE TO HUMANS.

SECTION III - PHYSICAL DATA

Boiling Range: 104 - 484 Deg. F
Vapor Density: Heavier than Air.
Evap. Rate: 0.21 x n-Butyl Acetate
Liquid Density: Heavier than Water.
Volatiles volume: 69.6 %
Wgt per gallon: 10.89 Pounds.
Appearance: RED LIQUID

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: >200 F LEL : 0.9 %

-EXTINGUISHING MEDIA:

CO2, DRY CHEMICAL, OR ALCOHOL TYPE FOAM.

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET

WEAR APPROVED SELF-CONTAINED BREATHING APPARATUS FOR PROTECTION FROM TOXIC VAPORS OR INADEQUATE OXYGEN SUPPLY.

-UNUSUAL FIRE & EXPLOSION HAZARDS:

CHLORONATED SOLVENTS INVOLVED IN FIRES MAY DECOMPOSE TO HYDROGEN CHLORIDE AND POSSIBLE TRACED OF PHOSGENE.

THE VAPORS CAN BE TOXIC AND ARE CORROSIVE.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

NONE ESTABLISHED - SEE SECTION II

CARE MUST BE TAKEN NOT TO EXCEED THE LOWEST TLV FROM SECTION 2.

WHEN IN DOUBT - WEAR AN APPROVED RESPIRATOR.

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.

EXCESSIVE EXPOSURE MAY CAUSE CENTRAL NERVOUS SYSTEM, LIVER OR KIDNEY EFFECTS.

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF FRESH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION IMMEDIATELY. KEEP VICTIM QUIET NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION. IF LARGE QUANTITIES ARE SWALLOWED, ADMINISTER LUKEWARM WATER (PINT) IF VICTIM IS COMPLETELY CONSCIOUS/ALERT. NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS. DO NOT INDUCE VOMITING.

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION. IF STICKY - USE WATERLESS CLEANER FIRST.

NOTE TO PHYSICIAN: BECAUSE OF RAPID ABSORPTION MAY OCCUR THROUGH LUNGS IF ASPIRATED AND CAUSE SYSTMIC EFFECTS, THE DECISION OF WHETHER TO INDUCE VOMITING OR NOT SHOULD BE MADE BY AN ATTENDING PHYSICIAN. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGEAL CONTROL. DANGER FROM LUNG ASPIRATION MUST BE WEIGHED AGAINST TOXICITY WHEN CONSIDERING EMPTYING THE STOMACH. EXPOSURE MAY INCREASE MYOCARDIAL IRRITABILITY. DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS UNLESS ABSOLUTELY NECESSARY.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur

-INCOMPATABILITY:

AVOID CONTACT WITH PURE OXYGEN, ALKALI METALS, OPEN FLAMES, AND ELECTRICAL ARCS.

-CONDITIONS TO AVOID:

AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE ALSO. AIRCRAFT TRANSPORT MUST BE IN STRICT ACCORDANCE WITH APPLICABLE REGULATIONS

-HAZARDOUS DECOMPOSITION PRODUCTS:

AT HIGH TEMPERATURES, DECOMPOSITION MAY CAUSE THE RELEASE OF HYDROGEN CHLORIDE VAPOR AND SMALL QUANTITIES OF OTHER TOXIC AND IRRITATING VAPORS SUCH AS PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
NON-COMBUSTIBLE: WEAR PROTECTION EQUIPMENT INDICATED IN SECTION VIII DURING CLEAN UP. SOAK UP WITH AN ABSORBANT AND PLACE IN A NON-LEAKING CONTAINER. SEAL TIGHTLY FOR PROPER DISPOSAL. FLUSH AREA WITH WATER.

-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-WEAR A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE IN OPEN, WELL VENTILATED AREAS. IN CONFINED AREAS, USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.
PRODUCT CONTAINS A HALOGENATED HYDROCARBON. EXCESSIVE EXPOSURE MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT. EXCESSIVE EXPOSURE MAY CAUSE CARBOXYHEMOGLOBINEMIA, THEREBY IMPIRING THE BLOOD'S ABILITY TO TRANSPORT OXYGEN. IN CONFINED OR POORLY VENTILATED AREAS, VAPORS CAN READILY ACCUMULATE AND CAUSE UNCONSCIOUSNESS OR DEATH.

-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.

-PROTECTIVE GLOVES:
USE IMPERVIOUS RUBBER GLOVES

-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD
MAY CAUSE PAIN OR MODERATE EYE IRRITATION.

-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AND SAFETY SHOWER AVAILABLE.

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
AVOID BREATHING VAPORS. STORE IN A COOL DRY PLACE. TIGHTLY CLOSE CONTAINERS. KEEP AWAY FROM SPARKS, OPEN FLAME OR STRONG OXIDIZING AGENTS.

-OTHER PRECAUTIONS:
VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS. DO NOT ENTER THESE AREAS WHERE VAPORS OF THIS PRODUCT ARE SUSPECTED UNLESS SPECIAL BREATHING APPARATUS IS USED.

NOTE

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(cont.)

SECTION IX - SPECIAL PRECAUTIONS (cont.)

-OTHER PRECAUTIONS: (cont.)

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MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: OIL MODIFIED FLAMEOUT
Trade Name : BLACK OIL MODIFIED FLAMEOUT
Product Code : R8-006
C.A.S. Number: NONE AVAILABLE

Hazard Ratings: none -> extreme
0 ---> 4
Health - 3
Fire - 1
Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV		OSHA/PEL	VP mm HG
1-1-1 TRICHOLORETHANE	000071-55-6	50-75	350	ppm	350	
DIETHYLENE ETHER	000123-91-1	1-5	25	ppm	100	
1,2 BUTYLENE OXIDE	000106-88-7	< 1.	40	ppm		
DOW INDUSTRIAL HYGIENE GUIDE FOR THIS PRODUCT IS 40 PPM.						
NITROMETHANE	000075-52-5	< 1.	100	ppm		
CRYSTALLINE SILICA	14464-46-1	< 1.	0.1	mg/M3		
The International Agency for Research on Cancer (IARC) has determined that there is limited evidence of the carcinogenicity of crystalline silica to humans.						
ISOPROPANOL	67-63-0	< 1.	400	ppm	400	33.
URETHANE CATALYST	77-58-7	< 1.	.1	ppm		
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3						
NORMAL BUTYL ALCOHOL	71-36-3	< 1.	50	ppm	100	4.8
XYLENE	1330-20-7	< 1.	100	ppm	100	25.
		S.T.E.L.=	150			
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4						
MANGANESE	7439-96-5	< 1.	5	mg/M3	5	
MINERAL SPIRITS/66	8032-32-4	< 1.	100	ppm	500	3.4
ACETIC ACID	64-19-7	< 1.	10	ppm	10	
		S.T.E.L.=	15			

SECTION III - PHYSICAL DATA

Boiling Range: 165 - 484 Deg. F
Evap. Rate: 0.01 x n-Butyl Acetate
Volatiles volume: 76.9 %
Appearance: BLACK

Vapor Density: Heavier than Air.
Liquid Density: Heavier than Water.
Wgt per gallon: 10.69 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: >200 F LEL : 0.9 %

-EXTINGUISHING MEDIA:

CO2, DRY CHEMICAL, OR ALCOHOL TYPE FOAM.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (cont.)

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET
WEAR APPROVED SELF-CONTAINED BREATHING APPARATUS FOR PROTECTION FROM TOXIC VAPORS OR INADEQUATE OXYGEN SUPPLY.

-UNUSUAL FIRE & EXPLOSION HAZARDS:

CHLORONATED SOLVENTS INVOLVED IN FIRES MAY DECOMPOSE TO HYDROGEN CHLORIDE AND POSSIBLE TRACED OF PHOSGENE.
THE VAPORS CAN BE TOXIC AND ARE CORROSIVE.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

NONE ESTABLISHED - SEE SECTION II
CARE MUST BE TAKEN NOT TO EXCEED THE LOWEST TLV FROM SECTION 2.
WHEN IN DOUBT - WEAR AN APPROVED RESPIRATOR.

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF FRESH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION IMMEDIATELY. KEEP VICTIM QUIET NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION. IF LARGE QUANTITIES ARE SWALLOWED, ADMINISTER LUKEWARM WATER (PINT) IF VICTIM IS COMPLETELY CONSCIOUS/ALERT. NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS. DO NOT INDUCE VOMITING.

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION. IF STICKY - USE WATERLESS CLEANER FIRST.

NOTE TO PHYSICIAN: BECAUSE OF RAPID ABSORPTION MAY OCCUR THROUGH LUNGS IF ASPIRATED AND CAUSE SYSTMIC EFFECTS, THE DECISION OF WHETHER TO INDUCE VOMITING OR NOT SHOULD BE MADE BY AN ATTENDING PHYSICIAN. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGEAL CONTROL. DANGER FROM LUNG ASPIRATION MUST BE WEIGHED AGAINST TOXICITY WHEN CONSIDERING EMPTYING THE STOMACH. EXPOSURE MAY INCREASE MYOCARDIAL IRRITABILITY. DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS UNLESS ABSOLUTELY NECESSARY.

(cont.)

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur

-INCOMPATABILITY:
AVOID CONTACT WITH PURE OXYGEN, ALKALI METALS, OPEN FLAMES, AND ELECTRICAL ARCS.

-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE ALSO, AIRCRAFT TRANSPORT MUST BE IN STRICT ACCORDANCE WITH APPLICABLE REGULATIONS

-HAZARDOUS DECOMPOSITION PRODUCTS:
AT HIGH TEMPERATURES, DECOMPOSITION MAY CAUSE THE RELEASE OF HYDROGEN CHLORIDE VAPOR AND SMALL QUANTITIES OF OTHER TOXIC AND IRRITATING VAPORS SUCH AS PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
NON-COMBUSTIBLE: WEAR PROTECTION EQUIPMENT INDICATED IN SECTION VIII DURING CLEAN UP. SOAK UP WITH AN ABSORBANT AND PLACE IN A NON-LEAKING CONTAINER. SEAL TIGHTLY FOR PROPER DISPOSAL. FLUSH AREA WITH WATER.

-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-WEAR A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE IN OPEN, WELL VENTILATED AREAS. IN CONFINED AREAS, USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.

-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.

-PROTECTIVE GLOVES:
USE IMPERVIOUS RUBBER GLOVES

-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD

-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AND SAFETY SHOWER AVAILABLE.

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

AVOID BREATHING VAPORS. STORE IN A COOL DRY PLACE. TIGHTLY CLOSE CONTAINERS. KEEP AWAY FROM SPARKS, OPEN FLAME OR STRONG OXIDIZING AGENTS.

-OTHER PRECAUTIONS:

VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS. DO NOT ENTER THESE AREAS WHERE VAPORS OF THIS PRODUCT ARE SUSPECTED UNLESS SPECIAL BREATHING APPARATUS IS USED.

NOTE

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MATERIAL SAFETY DATA SHEET

07/10/89

For Coatings, Resins and Related Materials

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: CRAWFORD LABORATORIES, INC
4165 SOUTH EMERALD AVENUE
CHICAGO IL 60609

Information Phone: (312)376-7132
Emergency Phone: (312)433-1307

Product Class: FLAMEOUT
Trade Name : 3.3#/GL VOC, BLACK FLAMEOUT
Product Code : R8-065
C.A.S. Number: SEE BELOW

Hazard Ratings: Health - 3
none -> extreme Fire - 1
0 ---> 4 Reactivity - 0

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Weight %	Exposure Limits ACGIH/TLV		OSHA/PEL	VP mm HG
1-1-1 TRICHOLORETHANE	000071-55-6	20-50	350	ppm	350	
DIETHYLENE ETHER	000123-91-1	< 1.	25	ppm	100	
1,2 BUTYLENE OXIDE	000106-88-7	< 1.	40	ppm		
DOW INDUSTRIAL HYGIENE GUIDE FOR THIS PRODUCT IS 40 PPM.						
NITROMETHANE	000075-52-5	< 1.	100	ppm		
CRYSTALLINE SILICA	14464-46-1	< 1.	0.1	mg/M3		
The International Agency for Research on Cancer (IARC) has determined that there is limited evidence of the carcinogenicity of crystalline silica to humans.						
XYLENE	1330-20-7	20-50	100	ppm	100	25.
		S.T.E.L.=	150			
THE ABOVE ITEM CONTAINS 17% ETHYLBENZENE WHICH IS C.A.S. #100-41-4						
URETHANE CATALYST	77-58-7	< 1.	.1	ppm		
TLV FOR ABOVE ITEM IS LISTED AS 0.1 mg Sn/M3 and STEL=0.2mg/M3						
NORMAL BUTYL ALCOHOL	71-36-3	< 1.	50	ppm	100	4.8
MINERAL SPIRITS/66	8032-32-4	< 1.	100	ppm	500	3.4
METHYLENE CHLORIDE	75-09-2	5-20	100	ppm	500	340
NOTE - THE ACGIH 100 PPM IS FOR 8 HOUR TWA FOR ANY 15 MINUTE EXCURSION, THE STEL IS 500 PPM						
THE OSHA PEL IS - 500 PPM - 8 HOUR TWA 1000 PPM - ACCEPTABLE CEILING CONCENTRATION 2000 PPM - ACCEPTABLE PEAK ABOVE CEILING CONCENTRATION FOR 8 HOUR SHIFT. THE MAXIMUM DURATION FOR THIS EXPOSURE IS 5 MINUTES IN ANY 15 MINUTE EXCURSION.						
CANCER INFORMATION - THE ABOVE MATERIAL HAS CAUSED CANCER IN CERTAIN LABORATORY ANIMALS, OF QUESTIONABLE RELEVANCE TO HUMANS.						
C-TERT. AMYLPHENOL	3279-27-4	< 1.	Undetermined			
METHANOL	67-56-1	< 1.	200	ppm	200	96.

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: R8-065

SECTION III - PHYSICAL DATA

Boiling Range: 104 - 484 Deg. F
Evap. Rate: 0.42 x n-Butyl Acetate
Volatiles volume: 73.1 %
Appearance: BLACK LIQUID
Vapor Density: Heavier than Air.
Liquid Density: Heavier than Water.
Wgt per gallon: 10.04 Pounds.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: Flash Point: >200F SETA LEL : 0.9 %

-EXTINGUISHING MEDIA:

CO2, DRY CHEMICAL, OR ALCOHOL TYPE FOAM.

-SPECIAL FIREFIGHTING PROCEDURES:

WATER MAY BE USED TO KEEP EXPOSED CONTAINERS COOL, AND TO KEEP FLAMMABLE STRUCTURES WET
WEAR APPROVED SELF-CONTAINED BREATHING APPARATUS FOR PROTECTION FROM TOXIC VAPORS OR INADEQUATE OXYGEN SUPPLY.

-UNUSUAL FIRE & EXPLOSION HAZARDS:

CHLORONATED SOLVENTS INVOLVED IN FIRES MAY DECOMPOSE TO HYDROGEN CHLORIDE AND POSSIBLE TRACED OF PHOSGENE.
THE VAPORS CAN BE TOXIC AND ARE CORROSIVE.

SECTION V - HEALTH HAZARD DATA

-PERMISSIBLE EXPOSURE LEVEL:

NONE ESTABLISHED - SEE SECTION II
CARE MUST BE TAKEN NOT TO EXCEED THE LOWEST TLV FROM SECTION 2.
WHEN IN DOUBT - WEAR AN APPROVED RESPIRATOR.

-EFFECTS OF OVEREXPOSURE:

OVEREXPOSURE MAY PRODUCE VARIOUS EFFECTS, INCLUDING: 1-ACUTE TOXICITY, RESULTING IN HEADACHE, DIZZINESS, NAUSEA, AND LOSS OF CONSCIOUSNESS. 2-EYE IRRITATION 3-IRRITATED MUCOUS MEMBRANES 4-VOMITING DUE TO INGESTION 5-DEFATTING AND DRYING OF THE SKIN, WHICH MAY RESULT IN IRRITATION AND DERMATITIS.
EXCESSIVE EXPOSURE MAY CAUSE CENTRAL NERVOUS SYSTEM, LIVER OR KIDNEY EFFECTS.

-FIRST AID:

--EYE CONTACT-FLUSH WITH PLENTY OF FRESH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

--INHALATION-REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION IMMEDIATELY. KEEP VICTIM QUIET NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS.

--INGESTION-IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION. IF LARGE QUANTITIES ARE SWALLOWED, ADMINISTER LUKEWARM WATER (PINT) IF VICTIM IS COMPLETELY CONSCIOUS/ALERT. NEVER GIVE AN UNCONSCIOUS PERSON LIQUIDS. DO NOT INDUCE VOMITING.

--SKIN CONTACT-FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL

(cont.)

CRAWFORD LABORATORIES, INC
Material Safety Data Sheet for: R8-065

SECTION V - HEALTH HAZARD DATA (cont.)

-FIRST AID: (cont.)
CLEANED. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION.
IF STICKY - USE WATERLESS CLEANER FIRST.

NOTE TO PHYSICIAN: BECAUSE OF RAPID ABSORPTION MAY OCCUR THROUGH LUNGS IF ASPIRATED AND CAUSE SYSTMIC EFFECTS, THE DECISION OF WHETHER TO INDUCE VOMITING OR NOT SHOULD BE MADE BY AN ATTENDING PHYSICIAN. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGEAL CONTROL. DANGER FROM LUNG ASPIRATION MUST BE WEIGHED AGAINST TOXICITY WHEN CONSIDERING EMPTYING THE STOMACH. EXPOSURE MAY INCREASE MYOCARDIAL IRRITABILITY. DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS UNLESS ABSOLUTELY NECESSARY.

SECTION VI - REACTIVITY DATA

STABLITY: [ ] Unstable [x] Stable
HAZARDOUS POLYMERIZATION: [ ] May occur [x] Will not occur
-INCOMPATABILITY:
AVOID CONTACT WITH PURE OXYGEN, ALKALI METALS, OPEN FLAMES, AND ELECTRICAL ARCS.
-CONDITIONS TO AVOID:
AVOID HEAT, SPARKS, OPEN FLAMES, AND INCOMPATIBILITIES ABOVE ALSO, AIRCRAFT TRANSPORT MUST BE IN STRICT ACCORDANCE WITH APPLICABLE REGULATIONS
-HAZARDOUS DECOMPOSITION PRODUCTS:
AT HIGH TEMPERATURES, DECOMPOSITION MAY CAUSE THE RELEASE OF HYDROGEN CHLORIDE VAPOR AND SMALL QUANTITIES OF OTHER TOXIC AND IRRITATING VAPORS SUCH AS PHOSGENE.

SECTION VII - SPILL OR LEAK PROCEDURES

-STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
NON-COMBUSTIBLE: WEAR PROTECTION EQUIPMENT INDICATED IN SECTION VIII DURING CLEAN UP. SOAK UP WITH AN ABSORBANT AND PLACE IN A NON-LEAKING CONTAINER. SEAL TIGHTLY FOR PROPER DISPOSAL. FLUSH AREA WITH WATER.
-WASTE DISPOSAL METHOD:
DISPOSAL MUST BE IN ACCORDANCE WITH CURRENT LOCAL, STATE AND FEDERAL REGULATION. CONTACT AN APPROVED DISPOSAL FACILITY.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

-RESPIRATORY PROTECTION:
IMPORTANT-WEAR A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE IN OPEN, WELL VENTILATED AREAS. IN CONFINED AREAS, USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.
PRODUCT CONTAINS A HALOGENATED HYDROCARBON. EXCESSIVE EXPOSURE MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT. EXCESSIVE EXPOSURE MAY CAUSE CARBOXYHEMOGLOBINEMIA, THEREBY IMPIRING THE BLOOD'S ABILITY TO TRANSPORT OXYGEN. IN
(cont.)

SECTION VIII - SPECIAL PROTECTION INFORMATION: (cont.)

-RESPIRATORY PROTECTION: (cont.)
CONFINED OR POORLY VENTILATED AREAS, VAPORS CAN READILY ACCUMULATE AND CAUSE UNCONSCIOUSNESS OR DEATH.

-VENTILATION:
MUST PROVIDE ADEQUATE VENTILATION, SEE PARAGRAPH ABOVE.

-PROTECTIVE GLOVES:
USE IMPERVIOUS RUBBER GLOVES

-EYE PROTECTION:
WEAR APPROVED SAFETY GOGGLES AND/OR FACE SHIELD
MAY CAUSE PAIN OR MODERATE EYE IRRITATION.

-OTHER PROTECTIVE EQUIPMENT:
HAVE EYE BATH AND SAFETY SHOWER AVAILABLE.

SECTION IX - SPECIAL PRECAUTIONS

-PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
AVOID BREATHING VAPORS. STORE IN A COOL DRY PLACE. TIGHTLY CLOSE CONTAINERS. KEEP AWAY FROM SPARKS, OPEN FLAME OR STRONG OXIDIZING AGENTS.

-OTHER PRECAUTIONS:
VAPORS ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS. DO NOT ENTER THESE AREAS WHERE VAPORS OF THIS PRODUCT ARE SUSPECTED UNLESS SPECIAL BREATHING APPARATUS IS USED.

NOTE

All information and opinions in this report are based on experience and computer programming which we believe to be reliable. We believe that the information contained herein is current as of the date of this report. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of Crawford Laboratories, Inc., it is the user's obligation to determine the conditions of safe use of this product.

Crawford Laboratories, Inc., makes no warranty, expressed or implied, as to the accuracy of the information and opinions, and assumes no responsibility for any damage to person, property or business arising from such use.

text03

MATERIAL SAFETY DATA SHEET

Mobay Corporation
A Bayer USA INC. COMPANY

Bayer MOBAY

DIVISION ADDRESS

MOBAY CORPORATION
Polyurethane Division
Mobay Road
Pittsburgh, PA 15205-9741

ISSUE DATE 3/20/89
SUPERSEDES 1/2/89

TRANSPORTATION EMERGENCY: CALL CHEMTREC
TELEPHONE NO: 800-424-9300; DISTRICT OF COLUMBIA: 202-483-7616

MOBAY NON-TRANSPORTATION EMERGENCY NO.:
(412) 923-1800

I. PRODUCT IDENTIFICATION

PRODUCT NAME.....: Mondur TD-80 (All Grades)
PRODUCT CODE NUMBER.....: E-002
CHEMICAL FAMILY.....: Aromatic Isocyanate
CHEMICAL NAME.....: Toluene Diisocyanate (TDI)
SYNONYMS.....: Benzene, 1,3-diisocyanato methyl-
CAS NUMBER.....: 26471-62-5
T.S.C.A. STATUS.....: This product is listed on the TSCA Inventory.
OSHA HAZARD COMMUNICATION STATUS.....: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
CHEMICAL FORMULA.....: $C_9H_6N_2O_2$

II. HAZARDOUS INGREDIENTS

COMPONENTS:	%:	OSHA-PEL	ACGIH-TLV
2,4-Toluene Diisocyanate* (TDI) CAS# 584-84-9	80	0.02 ppm STEL 0.005 ppm 8HR TWA	0.005 ppm TWA 0.02 ppm STEL
2,6-Toluene Diisocyanate* (TDI) CAS# 91-08-7	20	Not Established	Not Established

*For Section 302 and 313 SARA information refer to Page 6, Section IX, SARA.

III. PHYSICAL DATA

APPEARANCE.....: Liquid
COLOR.....: Water white to pale yellow
ODOR.....: Sharp, pungent
ODOR THRESHOLD.....: Greater than TLV of 0.005 ppm
MOLECULAR WEIGHT.....: 174
MELT POINT/FREEZE POINT...: Approx. 55°F (13°C) for TDI
BOILING POINT.....: Approx. 484°F (251°C) for TDI
VAPOR PRESSURE.....: Approx. 0.025 mmHg @ 77°F (25°C) for TDI
VAPOR DENSITY (AIR=1).....: 6.0 for TDI
pH.....: Not Applicable
SPECIFIC GRAVITY.....: 1.22 @ 77°F (25°C)
BULK DENSITY.....: 10.18 lbs/gal
SOLUBILITY IN WATER.....: Not Soluble. Reacts slowly with water at normal room temperature to liberate CO_2 gas.
% VOLATILE BY VOLUME.....: Negligible

IV. FIRE & EXPLOSION DATA

FLASH POINT $^{o}F(^{o}C)$.....: $260^{o}F$ ($127^{o}C$) Pensky-Martens Closed Cup
FLAMMABLE LIMITS -
Lel.....: 0.9%
Uel.....: 9.5%
EXTINGUISHING MEDIA.....: Dry chemical (e.g. monoammonium phosphate, potassium sulfate, and potassium chloride), carbon dioxide, high expansion (proteinic) chemical foam, water spray for large fires. Caution: Reaction between water or foam and hot TDI can be vigorous.
SPECIAL FIRE FIGHTING PROCEDURES/UNUSUAL FIRE OR EXPLOSION HAZARDS:
Full emergency equipment with self-contained breathing apparatus and full protective clothing (such as rubber gloves, boots, bands around legs, arms and waist) should be worn by fire fighters. No skin surface should be exposed. During a fire, TDI vapors and other irritating, highly toxic gases may generated by thermal decomposition or combustion. (See Section VIII). At temperatures greater than $350^{o}F$ ($177^{o}C$) TDI forms carbodiimides with the release of CO_2 which can cause pressure build-up in closed containers. Explosive rupture is possible. Therefore, use cold water to cool fire-exposed containers.

V. HUMAN HEALTH DATA

PRIMARY ROUTE(S) OF ENTRY.....: Inhalation. Skin contact from liquid, vapors or aerosols.
EFFECTS AND SYMPTOMS OF OVEREXPOSURE
INHALATION

Acute Exposure. TDI vapors or mist at concentrations above the TLV can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the TLV with similar symptoms as well as asthma attack. Exposure well above the TLV may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g., fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure.

Chronic Exposure. As a result of previous repeated overexposures or a single large dose, certain individuals may develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexposure to isocyanate has also been reported to cause lung damage (including decrease in lung function) which may be permanent. Sensitization can either be temporary or permanent.

V. HUMAN HEALTH DATA (Continued)

SKIN CONTACT

Acute Exposure. Isocyanates react with skin protein and moisture and can cause irritation which may include the following symptoms: reddening, swelling, rash, scaling or blistering. Cured material is difficult to remove.

Chronic Exposure. Prolonged contact can cause reddening, swelling, rash, scaling, blistering, and, in some cases, skin sensitization. Individuals who have developed a skin sensitization can develop these symptoms as a result of contact with very small amounts of liquid material or as a result of exposure to vapor.

EYE CONTACT

Acute Exposure. Liquid, aerosols or vapors are severely irritating and can cause pain, tearing, reddening and swelling. If left untreated, corneal damage can occur and injury is slow to heal. However, damage is usually reversible. See Section VI for treatment.

Chronic Exposure. Prolonged vapor contact may cause conjunctivitis.

INGESTION

Acute Exposure. Can result in irritation and corrosive action in the mouth, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea.

Chronic Exposure. None Found

MEDICAL CONDITIONS

AGGRAVATED BY EXPOSURE..: Asthma, other respiratory disorders (bronchitis, emphysema, bronchial hyperreactivity), skin allergies, eczema.

CARCINOGENICITY.....: No carcinogenic activity was observed in lifetime inhalation studies in rats and mice (International Isocyanate Institute).

NTP.....: The National Toxicology Program reported that TDI caused an increase in the number of tumors in exposed rats over those counted in non-exposed rats. The TDI was administered in corn-oil and introduced into the stomach through a tube. Based on this study, the NTP has listed TDI as a substance that may reasonably be anticipated to be a carcinogen in its Fourth Annual Report on Carcinogens.

IARC.....: IARC has announced that it will list TDI as a substance for which there is sufficient evidence for its carcinogenicity in experimental animals but inadequate evidence for the carcinogenicity of TDI to humans (IARC Monograph 39).

OSHA.....: Not listed.

EXPOSURE LIMITS

OSHA PEL.....: 0.02 ppm STEL/0.005 ppm 8HR TWA for 2,4'-TDI
ACGIH TLV.....: 0.005 ppm TWA/0.02 ppm STEL

VI. EMERGENCY & FIRST AID PROCEDURES

EYE CONTACT.....: Flush with copious amounts of water, preferably lukewarm for at least 15 minutes holding eyelids open all the time. Refer individual to physician or an ophthalmologist for immediate follow-up.

VI. EMERGENCY & FIRST AID PROCEDURE (Continued)

SKIN CONTACT.....: Remove contaminated clothing immediately. Wash affected areas thoroughly with soap and water for at least 15 minutes. Tincture of green soap and water is also effective in removing isocyanates. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists after the area is washed.

INHALATION.....: Move to an area free from risk of further exposure. Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Consult physician.

INGESTION.....: Do not induce vomiting. Give 1 to 2 cups of milk or water to drink. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Consult physician.

NOTE TO PHYSICIAN.....: Eyes. Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Workplace vapors have produced reversible corneal epithelial edema impairing vision. Skin. This compound is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burns. Ingestion. Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this compound. Respiratory. This compound is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a skin or pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate.

VII. EMPLOYEE PROTECTION RECOMMENDATIONS

EYE PROTECTION.....: Liquid chemical goggles or full-face shield. Contact lenses should not be worn. If vapor exposure is causing irritation, use a full-face, air-supplied respirator.

SKIN PROTECTION.....: Chemical resistant gloves (butyl rubber, nitrile rubber, polyvinyl alcohol). However, please note that PVA degrades in water. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area covered only by the cream to a minimum.

RESPIRATORY PROTECTION....: An approved positive pressure air-supplied respirator is required whenever TDI concentrations are not known or exceed the Short-Term Exposure or Ceiling Limit of 0.02 ppm or exceed the 8-hour Time Weighted Average TLV of 0.005 ppm. An approved air-supplied respirator with full facepiece must also be worn during spray application, even if exhaust ventilation is used. For emergency and other conditions where the exposure limits may be greatly exceeded, use an approved, positive pressure self-contained breathing apparatus. TDI has poor warning properties since the odor at which TDI can be smelled is substantially higher than 0.02 ppm. Observe OSHA regulations for respirator use (29 CFR 1910.134).

VII. EMPLOYEE PROTECTION RECOMMENDATIONS (Continued)

VENTILATION.....: Local exhaust should be used to maintain levels below the TLV whenever TDI is handled, processed, or spray-applied. At normal room temperatures (70°F) TDI levels quickly exceed the TLV unless properly ventilated. Standard reference sources regarding industrial ventilation (e.g., ACGIH Industrial Ventilation) should be consulted for guidance about adequate ventilation.

MONITORING.....: TDI exposure levels must be monitored by accepted monitoring techniques to ensure that the TLV is not exceeded. (Contact Mobay for guidance). See Volume 1 (Chapter 17) and Volume 3 (Chapter 3) in Patty's Industrial Hygiene and Toxicology for sampling strategy.

MEDICAL SURVEILLANCE.....: Medical supervision of all employees who handle or come in contact with TDI is recommended. These should include preemployment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum). Persons with asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization should be excluded from working with TDI. Once a person is diagnosed as sensitized to TDI, no further exposure can be permitted.

OTHER.....: Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Follow all label instructions.

VIII. REACTIVITY DATA

STABILITY.....: Stable under normal conditions.

POLYMERIZATION.....: May occur if in contact with moisture or other materials which react with isocyanates. Self-reaction may occur at temperatures over 350°F (177°C) or at lower temperatures if sufficient time is involved. See Section IV.

INCOMPATIBILITY (MATERIALS TO AVOID)....: Water, amines, strong bases, alcohols. Will cause some corrosion to copper alloys and aluminum. Reacts with water to form heat, CO_2 and insoluble ureas.

HAZARDOUS DECOMPOSITION PRODUCTS.....: By high heat and fire: carbon monoxide, oxides of nitrogen, traces of HCN, TDI vapors and mist.

IX. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Evacuate and ventilate spill area; dike spill to prevent entry into water system; wear full protective equipment, including respiratory equipment during clean-up. (See Section VII).

Major Spill: Call Mobay at 412/923-1800. If transportation spill, call CHEMTREC 800/424-9300. If temporary control of isocyanate vapor is required, a blanket of protein foam (available at most fire departments) may be placed over the spill. Large quantities may be pumped into closed, but not sealed, container for disposal.

IX. SPILL OR LEAK PROCEDURES (Continued)

Minor Spill: Absorb isocyanate with sawdust or other absorbent, shovel into suitable unsealed containers, transport to well-ventilated area (outside) and treat with neutralizing solution: mixture of water (80%) with non-ionic surfactant Tergitol TMN-10 (20%), or; water (90%), concentrated ammonia (3-8%) and detergent (2%). Add about 10 parts or neutralizer per part of isocyanate, with mixing. Allow to stand uncovered for 48 hours to let CO_2 escape.
Clean-up: Decontaminate floor with decontamination solution letting stand for at least 15 minutes.
CERCLA (SUPERFUND) REPORTABLE QUANTITY: 100 pounds for TDI
WASTE DISPOSAL METHOD.....: Follow all federal, state or local regulations. TDI must be disposed of in a permitted incinerator or landfill. Incineration is the preferred method for liquids. Solids are usually incinerated or landfilled. Empty containers must be handled with care due to product residue. Decontaminate containers prior to disposal. Empty decontaminated containers should be crushed to prevent reuse. DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH. (See Sections IV and VIII). Vapors and gases may be highly toxic.
RCRA STATUS.....: TDI is listed as a hazardous waste (No. U-223) under Title 40 Code of Federal Regulations, Section 261.33 (f). The residue from decontaminating a TDI spill is also classified as a hazardous waste under Section 261.3 (c)(2) or RCRA.
SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA), TITLE III:
Section 302 - Extremely Hazardous Substances: 2,4-Toluene Diisocyanate (TDI) CAS# 584-84-9 = 80%
2,6-Toluene Diisocyanate (TDI) CAS# 91-08-7 = 20%

Section 313 - Toxic Chemicals: 2,4-Toluene Diisocyanate (TDI) CAS# 584-84-9 = 80%
2,6-Toluene Diisocyanate (TDI) CAS# 91-08-7 = 20%

X. SPECIAL PRECAUTIONS & STORAGE DATA

STORAGE TEMPERATURE (MIN./MAX.).....: 70°F (21°C)/90°F (32°C)
AVERAGE SHELF LIFE.....: 12 months
SPECIAL SENSITIVITY (HEAT, LIGHT, MOISTURE).: If container is exposed to high heat, 375°F (177°C) it can be pressurized and possibly rupture. TDI reacts slowly with water to form polyureas and liberates CO_2 gas. This gas can cause sealed containers to expand and possibly rupture.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING.: Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Prevent all contact. Do not breathe the vapors. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent chronic overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Exposure to vapors of heated TDI can be extremely dangerous. Employee education and training in safe handling of this product are required under the OSHA Hazard Communication Standard.

XI. SHIPPING DATA

D.O.T. SHIPPING NAME.....:	Toluene Diisocyanate
TECHNICAL SHIPPING NAME...:	Toluene Diisocyanate (TDI)
D.O.T. HAZARD CLASS.....:	Poison B
UN/NA NO.....:	UN 2078
PRODUCT RQ.....:	100 pounds
D.O.T. LABELS.....:	Poison
D.O.T. PLACARDS.....:	Poison
FRT. CLASS BULK.....:	Toluene Diisocyanate
FRT. CLASS PKG.....:	Chemicals, NOI (Toluene Diisocyanate) NMFC 60000
PRODUCT LABEL.....:	Mondur TD-80 Product Label

XII. ANIMAL TOXICITY DATA

ACUTE TOXICITY

ORAL, LD50.....: Range of 4130-6170 mg/kg (Rats and Mice)

DERMAL, LD50.....: Greater than 10,000 mg/kg (Rabbits)

INHALATION, LC50.(4 hr).: Range of 16-50 ppm (Rat), 10 ppm (Mouse), 11 ppm (Rabbit), 13 ppm (Guinea Pig).

EYE EFFECTS.....: Severe eye irritant capable of inducing corneal opacity.

SKIN EFFECTS.....: Moderate skin irritant. Primary dermal irritation score: 4.12/8.0 (Draize). However, repeated or prolonged contact may culminate in severe skin irritation and/or corrosion.

SENSITIZATION.....: Skin sensitizer in guinea pigs. One study using guinea pigs reported that repeated skin contact with TDI caused respiratory sensitization. Although poorly defined in experimental animal models, TDI is known to be a pulmonary sensitizer in humans. In addition, there is some evidence that cross-sensitization between different types of diisocyanates may occur.

SUB-CHRONIC/CHRONIC TOXICITY: Sub-chronic and chronic animal studies show that the primary effects of inhaling vapors and/or aerosols of TDI are restricted to the pulmonary systems. Emphysema, pulmonary edema, pneumonitis and rhinitis are common pathologic effects. Extended exposures to as low as 0.1 ppm TDI have induces pulmonary inflammation.

OTHER

CARCINOGENICITY.....: The NTP conducted carcinogenesis studies of a commercial grade TDI using rats and mice in which the test material was diluted in corn oil and administered by gavage. The investigators concluded that TDI was carcinogenic in male and female rats (fibrosarcomas, pancreatic adenomas, neoplastic liver nodules and mammary gland fibrosarcomas) and female mice (hemangiosarcomas and hepatocellular adenomas). However, chronic inhalation studies in which rats and mice were exposed to 0.05 and 0.15 ppm TDI (10-30 times recommended TLV, 8-hr level) induced no treatment-related tumorigenic effects. In these studies, both exposure levels produced extensive irritation to the nasal passages and upper respiratory system of the test animals indicating that suitable effective exposures were administered.

XII. ANIMAL TOXICITY DATA (Continued)

MUTAGENICITY.....: TDI is positive in the Ames assay with activation. However, mammalian cell transformation assays using human lung cells and Syrian hamster kidney cells were negative, as were micronucleus tests using rats and mice.

TERATOGENICITY.....: Rats were exposed to an 80:20 mixture of 2,4- and 2,6- toluene diisocyanate vapor at analytical concentrations of 0.021, 0.12 and 0.48 ppm. Minimal fetotoxicity was observed at a maternally toxic concentrations of 0.48 ppm. The NOEL for maternal and developmental toxicity was 0.12 ppm. No embryotoxicity or teratogenicity was observed.

AQUATIC TOXICITY.....: LC_{50} - 96 hr (static): 165 mg/liter (Fathead minnow)
LC_{50} - 96 hr (static): Greater than 508 mg/liter (Grass shrimp)
LC_{50} - 24 hr (static): Greater than 500 mg/liter (Daphnia magna)

XIII. APPROVALS

REASON FOR ISSUE.....: Revising TLV in Sections II and V
PREPARED BY.....: G. L. Copeland
APPROVED BY.....: J. H. Chapman
TITLE.....: Manager, Product Safety - Polyurethane & Coatings

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